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ABSTRACT

This document describes six different approaches to outcomes assessments, approaches that are named in the titles of chapters 2 through 7. The chapters and authors are as follows: "Perspectives on Assessment Policy and Practice" (Bragg, Harmon); "Total Quality Management" (Bragg); "Assessing Student Success" (Harmon); "Value-Added Assessment" (Harmon); "Concept Mapping" (Grayson); "Outcomes Assessment in Vocational Education" (McCaslin); and "Performance Assessment" (Mabry). A "Conclusion" following chapter 7 offers the following implementation strategies: (1) ensure that a clear institutional mission provides a framework for outcomes assessment; (2) focus assessment on institutional improvement; (3) gain top institutional commitment; (4) scan the external environment; (5) use democratic methods to conceptualize outcomes for vocational education, actively involving a wide range of stakeholders; (6) make the goal of identifying and meeting individual student needs a top priority; (7) build an organizational structure that supports data-driven decision making, planning, and program improvement; (8) use multiple measures to develop comprehensive records of student performance; (9) conduct routine program audits; (10) ensure feedback loops; (11) design reward systems that support the use of outcomes assessment system for improvement; and (12) develop dissemination strategies that support data use. Reference lists at the end of each chapter contain a total of 207 publications. (CML)

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ALTERNATIVE APPROACHES TO OUTCOMES ASSESSMENT FOR POSTSECONDARY VOCATIONAL EDUCATION

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ALTERNATIVE APPROACHES TO OUTCOMES ASSESSMENT FOR POSTSECONDARY VOCATIONAL EDUCATION

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Alverno College, Milwaukee, Wisconsin
Community College of Vermont, Waterbury, Vermont
Dallas County Community College District, Dallas, Texas
Delaware Technical and Community College, Dover, Delaware
Fox Valley Technical College, Appleton, Wisconsin
Middlesex County College, Edison, New Jersey
Mt. Hood Community College, Gresham, Oregon
Northeast Missouri State University, Kirksville, Missouri
Sante Fe Community College, Santa Fe, New Mexico
Seattle Central Community College, Seattle, Washington

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Introduction

Over the last two decades, all levels of America's educational enterprise have come under increasingly stringent scrutiny. At least since the early 1980s, policymakers, business and industry leaders, and educational reformers have called for increased performance and accountability in all aspects of education. While calls for reform are certainly not without precedent, this most recent round of criticism is unusual in its protracted length, in the diversity of organizations that have issued reports and offered recommendations, and in the scope of the reforms that are being advocated. Efforts to set standards at the national, state, and local levels are a central focus of many of these educational reform initiatives.

State agencies, accreditation associations, and major employers press for outcomes assessment

Postsecondary education has not escaped the calls for reform. According to Banta (1990), almost three-fourths of the states are recommending that their public postsecondary institutions make improvements in outcomes assessment. State governments and accreditation associations have been particularly influential in the movement to implement outcomes assessment in postsecondary education. Recommendations of these groups have focused on creating assessment systems that are sensitive to measuring educational processes—as they have historically—as well as educational outcomes. Postsecondary institutions are increasingly seeking to demonstrate that they are meeting reform requirements by improving educational processes, developing performance indicators, and conducting assessment to determine the quality of teaching and learning (Kreider & Walleri, 1988).

Reform of vocational education at the postsecondary level is being encouraged by several groups. America's major employers are one group that is calling for better education to increase economic competitiveness. In discussing policy recommendations made by SCANS (Secretary's Commission on Achieving Necessary Skills) to improve workforce preparation systems, Brock explained that

> for SCANS to succeed, more businesses and schools must embrace these concepts. Our goal is to affect every school, every student, and every workplace. We hope to have a clear and specific impact on retraining programs and community colleges (1991, p. 25).

Federal vocational education legislation mandates that state accountability systems measure academic skills and performance

Reinforcing the need for improvements in postsecondary education, current federal legislation in the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 has as its major objective the development of improved accountability systems. This legislation requires that each state measure student learning gains in basic and more advanced academic skills and student performance in competency attainment, job or work skill attainment, retention or completion, or placement. The requirement to measure academic competence represents a departure from the type of outcomes traditionally measured in many states. Hoachlander and Rahn (1992) indicated that prior to passage of the federal legislation in 1990 only forty-one percent of the fifty states used academic achievement as a primary performance measure for postsecondary vocational education; job placement rates (86%) and occupational competency (50%) were more likely to be used.

Given the scope and intensity of the educational reform movement, it is not surprising that institutions are being encouraged to look at a broader set of outcomes than had been used traditionally and to reexamine the means by which these outcomes were being measured. As new educational goals emerge to address reform directives and as new approaches to vocational education are employed, alternative approaches to outcomes assessment are essential. It is this need for alternative approaches that has provided the impetus for this book.

A Conceptual Framework for Exploring Outcomes Assessment

Terms used in this book

The terms "outcomes," "assessment," "traditional," and "alternative" are used extensively throughout this book and applied to educational institutions, programs, and students. The term "outcomes" is used to refer to observable and quantifiable expressions of results that can accrue from the provision of education. The term "assessment" relates to gathering and analyzing information about how education can be improved and the impact that it has (Sims, 1992). Therefore, "outcomes assessment" refers to evaluative processes that determine the results of education at the institutional, program, and student levels.

We believe that it is possible to look at outcomes assessment—its focus as well as its methodologies—from either a "traditional" or "alternative" perspective. We define "traditional" as those outcomes that have been routinely used in the practice of postsecondary vocational education, such as job placement, occupational competence, program completion or retention, and earnings. These outcomes have traditionally been measured with licensure and certification tests, locally-designed tests, follow-up surveys, and self reports.

"Alternative" outcomes and outcome measures, on the other hand, refer to results that have *not* been used extensively by postsecondary vocational education. Examples of outcomes that fall into this category include transfer success, job satisfaction, and individual attainment of educational and career goals. "Alternative assessment" approaches can refer to "virtually any form of evaluation other than traditional paper and pencil, machine-scored, or multiple-choice tests" (Stefonek, 1991, p. 1). The goal of alternative assessment is to produce more valid information about student knowledge and skills than has been available with more standardized testing procedures.

Calls for reform include the need for improved assessment at the institutional, program, and student levels

We hypothesize that there are three types of outcomes to be considered when assessing postsecondary vocational education: institutional outcomes, program outcomes, and student outcomes. Within the range of educational activities, there are certain goals that can only be effectively and efficiently addressed at the institutional level. In some cases these are outcomes that represent an aggregation of all efforts occurring across the institution, such as institution-wide retention rates and student satisfaction. In other cases, the outcomes reflect the results of centralized efforts, such as the impact of economic development initiatives or the utility of management information systems. Often, outcomes assessment at this level is viewed as part of institutional effectiveness evaluation (Alfred & Kreider, 1991; Nichols, 1991; Seybert, 1990).

Program outcomes, also referred to as functional-area outcomes (Alfred & Kreider, 1991), can serve as a bridge between institutional and student outcomes. They provide a means by which an institution and its stakeholders can measure the appropriateness and effectiveness of specific programmatic efforts. In some cases, programs may be assessed by aggregating student outcome measures. Traditional aggregated outcome measures include student enrollment, retention, graduation, and job placement rates and employer and graduate satisfaction levels. In some cases, however, outcomes must be assessed at the program level because that is where they have the most meaning. Often these outcome measures are linked to the efficiency with which programs use resources and personnel and to the effectiveness of services for diverse student populations.

Finally, student outcomes are concerned with changes that occur in individuals as a result of their participation in an educational experience. The concept of student outcomes is frequently expressed in terms of the value that is added to an individual as a consequence of that participation. These outcomes include the knowledge, skill, and attitudes that learners are expected to acquire and demonstrate. They are measured by assessing an individual's performance. These measures include gains in knowledge and skill competence and are frequently measured by competency- or performance-based tests (taking many forms) and follow-up surveys.

About This Book

Innovations in outcomes assessment are the focus of this book

This book discusses innovations in outcomes assessment for postsecondary education, especially vocational education, that have been identified during a two-year research effort of the National Center for Research in Vocational Education (NCRVE) site at the University of Illinois. Our research has involved a wide range of two-year public and private community and technical colleges across the United States where we have had the opportunity to study and learn how assessment approaches have been employed. Although it is impossible to fully report the breadth and depth of our research findings, we have attempted to share the most important findings to assist you in pursuing future outcomes assessment endeavors. Ideas reported here represent what we believe are some of the newest and most promising ideas in how to conceptualize and conduct outcomes assessment in two-year postsecondary educational institutions.

Intended Audiences

Local leaders, institutional researchers, and policy makers are primary audiences for this book

There are two audiences of readers for this book. First, the primary audience is comprised of local postsecondary educational leaders who have responsibility for conceptualizing and administering outcomes assessment, especially for vocational education. This group includes community college presidents, institutional researchers, and vocational education administrators who have primary responsibility for improving programs and meeting accountability requirements. For this audience, our goal is to bring a new level of understanding about outcomes assessment and to encourage the exploration of various approaches to measuring outcomes. Of course, full-scale implementation of any assessment approach will require more information than can be provided in this book, so we encourage readers to explore the extensive list of

references provided at the end of each chapter as a basis for further implementation efforts.

The second intended audience includes federal, state, and local policymakers, government agency staff, program evaluators, researchers, teacher educators, and others who are involved in advocating, developing, or disseminating innovations in outcomes assessment for postsecondary vocational education. Similarly to the first group of readers, our goal has been to create a greater level of understanding about alternative approaches to outcomes assessment. To encourage further innovation for the purposes of improving practice is a second goal of ours for this group of readers.

Chapters and Content

Our primary purpose for preparing this publication was to describe various outcomes assessment approaches, to challenge you to explore them further, and to encourage you to consider how they can be applied in your institution. The chapters are sequenced to address institutional outcomes, then program outcomes, and finally student outcomes assessment. Each chapter provides a discussion of each outcomes assessment approach and suggests implementation issues and strategies. Most chapters also discuss how the particular outcomes assessment approach has been applied in one or more postsecondary settings.

To provide a basis for exploring alternative approaches in outcomes assessment, Chapter One discusses external forces on accountability, particularly those stemming from recent policy recommendations and legislative mandates. Then, internal forces, which largely reflect shifts in institutional missions and student populations, are presented. With this background, research findings regarding outcomes assessment practices at selected two-year postsecondary institutions are presented. The chapter concludes with a discussion of challenges and recommendations for implementing outcomes assessment in postsecondary settings.

Chapter Two advances the argument that the "M" in TQM (total quality management) could just as easily stand for "measurement" as "management." This Chapter discusses the philosophical and theoretical bases for TQM and describes how this comprehensive approach can be implemented to enhance institutional effectiveness and ensure beneficial institutional outcomes for students. Observations are made about how TQM is being implemented at Fox Valley Technical College in Wisconsin.

Chapter Three focuses on an institutional approach known as the student success model that parallels, at least philosophically, many of the tenets of TQM. While some readers may associate this model with a counseling and educational planning model, we believe that it can provide the basis for outcomes assessment as well. This Chapter explores the way Santa Fe Community College (SFCC) in New Mexico has applied the student success model to develop and maintain institutional effectiveness and outcomes assessment.

In Chapter Four, the concept of value added is applied to outcomes assessment and discussed in relation to institution, program, and student outcomes assessment. The value-added assessment approaches used by Delaware Technical Community College, Northeast Missouri State University, and Alverno College are discussed. Issues surrounding the relationship between value-added and outcomes assessment are presented. In addition, the controversy about using pretest and posttest designs for measuring value added are explored and an argument for using performance assessment is made.

Chapter Five describes a recent innovation that offers promise for getting program-level outcomes assessment efforts started, no matter whether they are based on a TQM, student success, value-added, or other approach. Referred to as concept mapping, this innovation is a bottom-up approach for producing a picture of how educational programs work and how they produce outcomes. This chapter illustrates how concept mapping was used to identify outcomes for vocational education at Black Hawk College in Illinois.

In Chapter Six, a schema for assessing educational, economic, and psycho-social outcomes for vocational education programs is presented. This chapter suggests that these outcomes must be considered in light of the educational needs and processes that influence vocational education. To conclude the chapter, a five-step process for conducting outcomes assessment is presented.

Chapter Seven addresses the contemporary topic of performance assessment of student knowledge and skills. This chapter defines common terms such as "performance assessment," "alternative assessment," and "authentic assessment." The chapter describes assessment techniques such as profiles and records of achievement, portfolios, and performance tasks. The chapter also discusses how these assessment techniques are being implemented in several secondary and postsecondary organizations and describes issues surrounding their use in these settings.

Finally, the Conclusion summarizes the main ideas in the book and offers some suggestions for implementing outcomes assessment in postsecondary vocational education. This chapter reiterates our challenge to consider alternative approaches as a means of

improving outcomes assessment practices for postsecondary vocational education.

How to Use the Book

Use this book to generate discussion, stimulate new ideas, and further implementation of outcomes assessment

Clearly, this book does not provide a step-by-step, cookbook approach to outcomes assessment. That was never our goal! Rather, we intended the ideas presented here to generate discussion and stimulate thinking about how alternative approaches to outcomes assessment could be employed by postsecondary institutions. Sometimes we share concepts that are not traditionally viewed as being a part of outcomes assessment strategies and techniques, especially for vocational education. For example, TQM, value-added, and concept mapping may seem out of place in this book. However, we believe that these innovations may actually offer the most promise for addressing the challenges postsecondary educators face in creating assessment systems. They may be particularly helpful in creating a holistic and systematic approach to assessment for postsecondary vocational education.

Indeed, throughout this book, we encourage readers to think beyond traditional approaches to outcomes assessment—as we have attempted to do—to consider new ways to meet an institution's accountability requirements. We believe Kouzes and Posner said it best when they wrote,

> The search for opportunities beyond tradition is an exploration in the new. It requires individual creativity and organizational innovation. That means that a leader must have an openness to ideas and a willingness to listen. It means that leaders must try untested approaches and accept the risks that accompany all experiments (1990, p. 54).

By challenging your thinking about outcomes assessment and encouraging you to consider how alternative approaches could be implemented in your institution, we believe the opportunity to advance the practice of outcomes assessment—to "explore the new"—can lead to innovation and improved education for all.

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Chapter 1

Perspectives on Assessment Policy & Practice

Debra D. Bragg and C. Michael Harmon

Overview

The current debate about outcomes assessment and accountability is largely a result of recommendations stemming from educational policy, research, and practice. Together, shifts in these areas have increased demands on educators to assess the results of their efforts (Ewell, 1989). Throughout this document, outcomes are viewed as the consequences of involvement in or with education.

This chapter is designed to provide the context for later chapters which define and describe evolving assessment approaches that can be used to address current demands for measuring outcomes and demonstrating accountability. Discussions about each of these approaches refer directly to postsecondary education, especially vocational education, in an attempt to advance implementation of outcomes assessment within that arena.

In this chapter

This chapter focuses discussion on the following topics:

Topic	See Page
Policy and Legislation	2
Other External Forces on Accountability	3
Internal Forces on Accountability	5
Current Outcomes Assessment Practices	6
Challenges for Practitioners	9

Policy & Legislation

Recent reports call for reform

In recent years, federal and state governments, the National Governor's Association, professional education associations, businesses, and other private groups have called for a wide range of reforms. Increasingly, these groups have encouraged educators to look beyond traditional practice to find ideas for improvements. Linkages between educational systems and the workplace are particularly prevalent in these reports. In addition, calls for improvement in assessment and accountability are plentiful. Selected prominent reports, listed chronologically, follow.

Report	Contents
Workforce 2000: Work and Workers for the 21st Century (Johnston & Packer, 1987)	• Discusses the serious mismatch between the skills of the workforce and jobs of the future.
The Forgotten Half: Non-College Youth in America (William T. Grant Commission, 1988)	• Reports the problems of non college-bound youth in transitioning from school to family and work.
Labor Force 2000: Corporate America Responds (Allstate Forum on Public Issues, 1989)	• Provides a business perspective on how corporations can contribute to educational reform.
America's Choice: High Skills or Low Wages! (Commission on Skills of the American Workforce, 1990)	• Examines problems with economic productivity and advocates higher standards and far-reaching reform.
America 2000: An Education Strategy (U.S. Department of Education, 1991)	• Provides a strategy for meeting six National Education Goals by the year 2000.
What Work Requires of Schools: A SCANS Report for America 2000 (Secretary's Commission on Achieving Necessary Skills, 1991)	• Examines the demands of the workplace and identifies five competency and three foundational areas required to enter employment.
Education Counts (Special Study Panel on Education Indicators, 1991)	• Recommends an information system and education indicators on issues.
Learning a Living: A Blueprint for High Performance (Secretary's Commission on Achieving Necessary Skills, 1992)	• Proposes a learning system designed to change schools, workplaces, and assessment systems.

Each of these reports contributes to the notion that all levels of education in America must change to support individual wage earners, businesses, and the nation's economy. For example, *America 2000* proposed a set of six national goals designed to drive educational reform. The fifth goal has direct implications for postsecondary education. It states that "every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship" (U.S. Department of Education, 1991, p. 19).

Federal vocational education legislation reinforces the need for accountability

Current federal legislation for vocational education has reinforced the importance of education for all aspects of employment as well as the need for accountability systems to measure their effects. Title I, Part B, of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, simply Perkins II as the law is commonly known, requires that each state measure student gains in academic skills, and occupational performance (Section 115(a) and (b)). It also encourages states to effectively serve special populations (Section 118(a)) and coordinate efforts among education and training programs receiving federal funds (Section 115(c)).

Measures of these gains are either being contemplated or made by states (Hoachlander & Rahn, 1992). In reviewing these outcome measures, it becomes apparent that many can be described as traditional in the sense that they continue to reflect the types of outcome measures historically mandated by vocational education legislation and government agencies or that they have been used routinely in the practice of vocational education. (See, for example, Darcy (1979), Stern (1988), and Wentling & Barnard (1985).)

New initiatives in the Perkins II legislation create a heightened need for outcomes assessment. For example, Title III, The Tech Prep Education Act, provides funding for new Tech Prep (technical preparation) educational programs to articulate secondary and postsecondary curriculum. In addition, the need for applied and integrated academic and vocational education curriculum is emphasized in the Tech Prep Act and elsewhere in the legislation. In order to satisfy these initiatives, outcomes assessment that can provide information for program improvement as well as determine the impact of these new initiatives on institutions, programs, or students will be needed.

Other External Forces on Accountability

Another important force in educational accountability has been state government. Many states have been active in promulgating educational policy related to postsecondary outcomes assessment.

State governments seek comprehensive data on a wide range of outcomes

Indeed, "almost three-fourths of the states are asking public institutions to do something about assessment" (Banta, 1990, p. 3). As with testing related to Perkins II, the perceived need to "do something" has frequently resulted in the consideration or adoption of standardized tests. Recently, however, it appears this emphasis may be diminishing as states seek to attain more comprehensive data on a wider range of outcomes for their postsecondary education institutions (Ewell, 1992).

Postsecondary education in the state of Washington is one instance in which standardized testing of all students at the end of the sophomore year has been considered and rejected. In 1989, the Washington State Higher Education Coordinating Board chose to not require a statewide testing program, preferring instead to fund faculty-driven, institution-centered assessment development and implementation efforts at each public community college and four-year institution (Moore, 1992). The result has been the development of course- and program-level assessment approaches specifically designed to meet the needs of individual colleges and their stakeholders. In some cases these approaches include portfolios, performance assessments, narrative assessments, and alternative assessment approaches.

In addition to issues related to testing, concerns continue to be expressed by students and parents about the rising cost of a college education, especially in light of the country's economic difficulties (McGuinness, 1991). At the same time, many state leaders see that their postsecondary education systems are overextended and underfinanced. They show concern about whether institutions can deal effectively "with other states for new industry and jobs if we keep spreading limited resources across too many mediocre institutions" (McGuinness, 1991, p. 1). The states were viewed by organizations that advocate reform, for example the National Governor's Association and Education Commission of the States, as the appropriate agent of change. This perspective has reinforced state mandates for performance-oriented accountability reports in addition to assessments of student learning.

Accrediting agencies require institutions attend to outcomes assessment issues

In response to the U.S. Department of Education and the Council on Postsecondary Accreditation (COPA) in the late 1980s, the six regional accrediting agencies expanded their emphasis on outcomes assessment. According to Banta (1990, p. 3), "This may have been the most influential development in capturing the attention of private colleges and universities with respect to outcomes assessment." Today, all six of the regional agencies require that their member institutions attend to outcomes assessment issues in some way (Marchese, 1990). In some cases (the New England Commission on Vocational Technical Career Institutions, for example), a mission-based approach was chosen. In other instances, exemplified by the North Central, Southern, and Western associations, an effectiveness indicator-based approach matched to the institution's

mission statement was chosen. Among the associations using an effectiveness indicator-based approach there appears to be considerable variation in the weight put on mission statements (high in the Southern and North Central associations, for example) and effectiveness indicators (high in the Western association). As a result of these efforts, by 1988 all of the accrediting associations "required evidence of achievement as a part of their institutional or programmatic reviews" (Marchese, 1990, p.371).

Internal Forces on Accountability

Of course, not all outcomes assessment programs are the consequence of external pressure. Before federal and state government bodies and accrediting agencies began stressing the importance of assessment, ground-breaking programs were being implemented at several two-year individual colleges such as Johnson County Community College in Kansas, Miami-Dade Community College in Florida, Midlands Technical College in South Carolina, Mt. Hood Community College in Oregon, and Prince Georges Community College in Maryland (Alfred, 1991). Four-year institutions frequently identified as leaders in the field are Alverno College and Northeast Missouri State University (Banta, 1990).

As a consequence of these and other calls for change and guided by the examples set at pioneering institutions, educators across the country have begun to reconsider the adequacy of both the goals that they are seeking to achieve and the mechanisms used to assess attainment of these goals in the form of outcomes. These changes have occurred in the areas of institutional effectiveness, program improvement, and student success. Postsecondary institutions are shifting away from measuring inputs to determine the quality of their services to measuring outcomes such as learner knowledge and skill attainment (Kreider & Walleri, 1988; Sims, 1992). These measurements are occurring because of the use of models that emphasize to varying degrees the evaluation of institutional mission and policies, programs or functional areas, and teaching and student learning (Alfred & Kreider, 1991; Nichols, 1991; Seybert, 1990).

A redefinition of outcomes reflects increased student diversity

The need to redefine appropriate outcomes and outcome measures is, in part, based on the policy changes that are being called for. It is also based on a shift in the type of students being served by postsecondary institutions in general and by their vocational education components in particular. This shift includes increasing numbers of women and minority students. The percentage of part-time students of both sexes and all races is also increasing dramatically (El-Khawas, Carter & Ottinger, 1988). As a consequence, patterns of attendance are extremely varied, making them difficult to define. According to Adelman (1992, p. 4), the

challenge before community colleges is in understanding that "who attends cannot be divorced from an understanding of *how* they attend." As will be discussed later in this chapter, the diverse nature of postsecondary students and their related attendance patterns must directly impact strategies undertaken by two-year postsecondary institutions to conduct outcomes assessment (Ewell, 1992).

Current Outcomes Assessment Practices

During 1991, we conducted research to provide an understanding of the nature of outcomes assessment practices carried out by two-year postsecondary educational institutions in the United States or their administrative agencies. Using a purposive sample of fifty-four organizations identified by a panel of national experts to be outstanding in some aspect of their outcomes assessment process, a one-hour semi-structured telephone interview was conducted. Respondents chosen for the interview were usually institutional researchers because of their knowledge about assessment efforts occurring across the curriculum. Of the total sample, seventy-four percent were community colleges, thirteen percent were public technical colleges, two percent were private proprietary colleges, and nine percent were administrative agencies.

The goal of this research was to address four general questions: (1) What outcomes are being assessed? (2) How are they being measured? (3) How are the results being used? and (4) What changes have occurred as a result of current outcomes assessment practices? These questions focused on general outcomes assessment processes as well as those specifically related to vocational education. An analysis of the findings revealed several important observations about practices conducted by institutions that some experts considered to be leaders in outcomes assessment.

First, seventy-eight percent of the organizations reported that they were conducting outcomes assessment processes as part of an institution-wide effort. Of the remaining twenty-two percent, outcomes assessment focused solely on vocational education; however, it was noted that thirty-three percent of these organizations were exclusively vocational instructional facilities. Within the comprehensive community colleges that made up the vast majority of two-year institutions in this study, outcomes assessment processes typically included vocational and other general or transfer education curricula. Therefore, for the selected two-year community colleges in this study, outcomes assessment was viewed as a process inclusive of the broad spectrum of curricula across the college and not likely to be segregated to vocational education. This finding has direct implications for the development of assessment processes that include outcome measures that can be interrelated to determine institutional, program, and student success.

Second, respondents were asked to describe the types of outcomes they were measuring as well as their use of alternative outcomes assessment (e.g., performance assessment, portfolios, and capstone projects). Information obtained in response to these questions were widely varied, potentially indicating a lack of consensus about the types of outcomes that two-year postsecondary institutions should be measuring. However, given this variation in response, it is important to note that the outcomes reported seemed to us to be fairly typical of those two-year institutions have traditionally measured. Only a few of the institutions seemed to be assessing outcomes not previously within the repertoire of their institutional research efforts; still fewer were developing or implementing alternative assessment approaches for these outcomes.

Outcomes	Frequency	Outcomes Assessment Methods
Academic achievement	13	standardized tests, exit tests, portfolios, capstone projects, exams graded by panels of experts, faculty and student surveys
Transfer success	13	transcript analysis, state tracking systems, feedback from receiving institutions
Student satisfaction	11	student surveys
Employer satisfaction	10	employer surveys
Attainment of student goals	7	student surveys, tracking systems
Employment success	6	state unemployment records, college placement office data
Occupational skill attainment	6	performance and narrative assessments, licensure and certification exams
Job placement	4	follow-up surveys
Student persistence	4	enrollment patterns

Third, respondents were asked to identify the driving force(s) behind any changes in their college's outcomes assessment processes over the past five years. Again, the responses varied widely; however, three forces were seen as providing the impetus for changes in a number of institution's outcomes assessment

practices. The first force was the chief executive officer (CEO), according to twenty-two percent of the respondents. These individuals were seen as committed to using information obtained through outcomes assessment for decision making about the institution and for measuring student performance. A second force identified by the same percentage of organizations was state or accrediting agencies. This is not surprising given the importance of accrediting agencies to the entire outcomes assessment movement. The third driving force behind changes was federal legislation, according to nine percent of the respondents. Similarly to accrediting agencies, legislation has mandated the development of outcomes assessment processes for postsecondary institutions.

Conspicuously absent from this list was driving forces related to student or faculty needs as well as program or curriculum improvement, which could lead one to conclude that institutions viewed outcomes assessment as an accountability rather than a program improvement tool. When respondents were asked how outcomes assessment information was used, however, thirty-three percent indicated program evaluation, thirty-one percent reported strategic planning, twenty-six percent described curriculum development, and eighteen percent spoke about resource allocation. Some of these processes tend to link information obtained through outcomes assessment back to institutional and program functions and are likely to contribute to periodic review and improvement. This type of information seems to be critical to making improvements in programs. This finding emphasizes the need to develop outcomes assessment processes that can address a broad array of needs, especially accountability and program improvement needs.

Outcomes assessment provides information for institutional accountability and program improvement

Finally, respondents were asked how outcomes assessment had changed their institutions. Nearly all respondents reinforced the notion that outcomes assessment was impacting institution-wide processes such as administration, personnel development, and curriculum development. Although responses were widely disparate, improvements in institutional decision making and planning were identified by thirty percent of the respondents. Other responses were better staff development, better alignment with business needs, improved climate for on-going assessment, more faculty use of results, and more confidence in institutional effectiveness—each identified by less than eight percent of the respondents.

To summarize major findings from this study, the potential exists for utilization of outcomes assessment to provide information to address institutional accountability as well as program improvement. This study indicated that postsecondary educational organizations, viewed as leaders in outcomes assessment, measure a wide variety of outcomes through relatively traditional means. Whether stimulated by internal or external forces, they conduct outcomes assessment in a manner that impacts the entire curriculum and

potentially yields improvements in administrative, instructional, personnel, and collaborative functions. Of importance for future work, the identification and development of outcome measures, beyond those traditionally used in postsecondary education, await development and implementation.

Challenges for Practitioners

Demands for outcomes assessment can be a challenge to practitioners

As the demands and expectations for outcomes assessment increase, so do the challenges for practitioners in postsecondary educational institutions. Ewell (1992) has identified several challenges that surround the multifaceted, pluralistic environment of these institutions. First, the overlapping goals and functions of these institutions create the need for accountability systems that can address different and sometimes competing goals (Smith, 1991).

A related challenge is that of multiple student bodies. Postsecondary institutions and their vocational programs serve several groups of students simultaneously. These include traditional, full-time students looking to transfer to four-year institutions; young adults seeking higher-paying employment options; middle-aged adults seeking retraining and career change; and retired adults investing in education for the sake of personal fulfillment. Each of these groups seeks different outcomes and requires different outcome measures (Ewell, 1989). Consequently, designing outcomes assessment around highly structured curriculum paths is extremely difficult to accomplish. This is because, according to Adelman (1992), students who come to colleges with very different needs do not take the curriculum the way it was designed. They simply do not participate in a lock-step fashion the way students might in secondary education.

Furthermore, a large percentage of the students participating in vocational education are adults who are voluntarily participating in the educational experiences. According to Ewell (1992), community college "students don't stand for assessment." He advocates assessment systems that are infused into the curriculum so that students are not intimidated by formal testing procedures. Alternative assessment approaches that enable students to demonstrate skills and knowledge in natural settings and at convenient times and places can help to accomplish this goal.

How can these and other assessment related challenges be addressed? Alfred and Kreider (1991), Simmons (1991), and (Sims, 1992) make the following recommendations for developing outcomes assessment systems:

Recommendations for Creating an Outcomes Assessment System

- Develop a clear, focused, and realistic mission statement that can provide the foundation for establishing goals as the basis for outcomes assessment and institutional effectiveness processes.
- Ensure that issues of cultural diversity and pluralism are adequately addressed for all faculty, staff members, students, governing boards, curricula, and services throughout the institution.
- Obtain commitment from the top of the institution to support the outcomes assessment processes with resources and make faculty the driving force behind development of assessment processes to ensure that useful information is created for all levels.
- Become a customer-driven organization by defining internal and external customer groups and ensuring that meeting their needs and expectations is the institution's top priority.
- Audit existing information collected about the institution's internal and external environments to determine what is known about how processes are functioning; reinforce and coordinate these essential data collection activities.
- Create longitudinal databases using qualitative and quantitative, institution-specific data on student performance, course taking patterns, and short- and long-term results from student participation.
- Conduct targeted evaluations to determine how individual programs are working and empower faculty, staff, and students throughout the institution to carryout these types of evaluations to make continuous improvements in programs.
- Develop better information about the infrastructure of the institution for planning and program improvement and ensure that this information is widely disseminated.
- Develop mechanisms for feeding assessment results back into the system for use in stimulating innovation and improving policies, programs, services, and student outcomes.

All of these recommendations can be accomplished through the use of specific outcomes that are measured throughout the institution, especially at the program and classroom levels. To address the challenges posed to practitioners in this chapter, information presented in the remainder of this book provides perspectives on approaches to assessment of outcomes at the institutional, program, and student levels.

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Chapter 2

Total Quality Management

Debra D. Bragg

Overview

Total quality management (TQM) is being adopted by American business and industry to improve quality and increase economic competitiveness. Educators have only recently begun to examine TQM and to consider its implications for educational reform and accountability. Little is known about how ideas regarding customer satisfaction, process management, and employee involvement apply to education, especially outcomes assessment. Are these ideas compatible with education? Can they improve quality in postsecondary education? Parallels between TQM and outcomes assessment and other related issues are explored in this chapter.

In this chapter

This chapter discusses the following topics:

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Five Goals of TQM	17
How TQM Relates to Outcomes Assessment	21
Implementation of TQM	23
Implementation Issues	25
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Guiding Principles of Total Quality Management (TQM)

Traditionally, higher education institutions have defined quality by their "faculty, facilities, support, curriculum, and student attributes" (Litten & Hall, 1989, p. 304), particularly in relation to their peer institutions. Consequently, the focus of measurement has largely been on those characteristics of higher education that mattered most to faculty and administrators within the system. Attention paid to external audiences has grown, however, as government, private funders, and taxpayers have increasingly demanded more accountability.

How is quality assessed in postsecondary vocational education settings? Quality can be assessed, as Harmon points out later in Chapter 4 of this document in his discussion of the value-added concept, by measuring changes in students between the time they enter and leave a vocational education program; or as McCaslin points out in Chapter 6 of this document, by measuring results of student participation evidenced by economic, educational, or psych-social outcomes; or as Mabry discusses in Chapter 7, by measuring how students actually perform specific tasks acquired in vocational education. In all cases, these approaches to assessment focus on end results; they determine whether desired outcomes have been achieved for programs and students.

TQM is a comprehensive and process-oriented approach to outcomes assessment

Without a doubt, total quality management (TQM) is concerned with end results. However, they are not the *only* consideration. TQM views outcomes assessment as having a place in determining quality; however, its view is much more comprehensive and process-oriented (Bryce, 1991a). In the TQM approach, outcomes assessment is conducted for the purpose of refining, managing, and measuring work processes so that customer needs can be met Some define quality as "the ability of a product or service to meet consistently the expectations of customers" (Ackerman, Coleman, Leger, & MacDorman, 1988, p. 5). Therefore, meeting customer needs and ensuring student outcomes through execution of well-managed processes becomes a primary concern throughout all levels of an institution.

The concept of continuous improvement is also central to understanding TQM, as is typified by Procter & Gamble's definition of quality, "the unyielding and continually improving effort by everyone in an organization to understand, meet, and exceed the expectations of customers" (Procter & Gamble, 1989, p. 1). TQM is characterized by its rigorous process for making small, incremental improvements through the use of group process, data analysis, and statistical tools (Bryce, 1991a).

TQM is a fairly recent phenomenon in the United States, especially in education. General principles that drive TQM evolved primarily from the philosophies of two Americans who worked extensively with Japan after World War II. W. Edwards Deming and Joseph Juran are credited with inspiring post-WWII Japan to adopt the quality methodology and eventually turning that country into a world economic competitor. Only in recent years have American business and industry begun to seriously consider the recommendations of Deming and Juran. Even fewer American educators are aware of TQM or considering its implications for educational restructuring and accountability (Brandt, 1992).

TQM may assist employers and educators to reach higher standards

Why is the time right for educators to consider quality management approaches? Recent attention focused on the role of employers and educational systems in economic competitiveness has heightened comparisons between reform in both these arenas (Kirby & Bragg, 1992). Representative of the calls for reform, the Commission on the Skills of the American Workforce (1990) has recommended employers adopt high-performance workplaces and the Secretary's Commission on Achieving Necessary Skills (SCANS) has encouraged educators to ensure "world-class standards of curriculum content and student performance" (SCANS, 1992, p. xix). TQM may provide an approach to assisting both employers and educators to reach higher standards.

Five Goals of TQM

What are the fundamental goals of TQM? They focus on mobilizing everyone in an institution to

- manage work processes,
- exceed customer expectations,
- ensure a systematic approach,
- measure for continuous improvement, and
- become involved in the entire process.

Managing Work Processes

A primary goal of TQM is to manage the flow of all work processes so that customer expectations are continually met or exceeded (Sherr & Lozier, 1991). A process can be viewed as "a set of interrelated work activities that are characterized by a set of specific inputs and value-added tasks that produce a set of specific outputs" (Ackerman,

Coleman, Leger, & MacDorman 1988, p. 5). All work can be seen as fitting into various types of processes and all employees can be viewed as managers of these processes. Applied to education, processes of postsecondary institutions such as admissions, registration, counseling, instruction, curriculum development, and job placement are the focus of process improvement.

Work processes contribute to or hinder student expectations and outcomes

TQM focuses on how work processes contribute to or hinder the realization of customer expectations (Ackerman et al., 1988). A fully-functioning TQM approach yields outputs (e.g., products and services) that are responsive to ever-changing customer needs. According to a TQM philosophy, a college's institutional effectiveness can be determined by measuring the effectiveness and efficiency of these processes. All work processes, viewed as operating within a system, contribute to meeting student needs and expectations, thereby producing desirable outcomes. The goal of a top-notch TQM approach is to ensure that these educational processes are continually refined and refocused on meeting student needs and expectations.

Exceeding Customer Expectations

A common theme of TQM is that customer needs drive quality improvement. Who are the customers of postsecondary vocational education? First and foremost, they are students. A focus on knowing student needs and expectations and continually trying to meet or exceed those needs is key to improving quality. Rhodes (1992) is critical of education's perspective toward students. He explains that "schools have been 'student-centered' in the same way that the work of a basketball team might be called 'hoop-centered.'" (p. 77). He describes educators as well intentioned but isolated and somewhat selfish in their attempts to win the game. Each educator, he explains, is shooting at the basket when he or she gets the ball. Even though each makes some baskets, the team usually loses. He concludes by saying,

> What does that metaphor have to do with paradigms for education? Keeping the student foremost in our thoughts has little to do with shifting our sense of the system. We still are looking *at* the student. The total quality view allows us to see with the student's eye view—to understand what the school and world around it looks like to children growing up today (Rhodes, 1992, p. 77).

The focus on customers is pervasive in Japanese business thoughts and actions. Japan was first in defining customers as both internal and external (Bryce, 1991b). Modern marketing practice in the U.S. also emphasizes the customer. Boone and Kurtz (1985) define marketing as "a company-wide consumer orientation with the

A focus on customers is pervasive in Japanese business and in modern U.S. marketing practices

objective of achieving long-term success. The key words are company-wide consumer orientation. All facets of the organization must be involved with assessing, and then satisfying, customer wants and needs" (p. 13). The process of converting needs into wants is seen as central to the purpose of modern marketing. TQM clearly adopts this perspective since it advocates that every employee work to understand, meet, and exceed customer needs and expectations.

By taking this perspective, customers of all processes can be viewed as within or outside of the system. Therefore, there are many types of customers of postsecondary education besides students. Seymour (1992) describes three sets of individuals or groups that play a role in quality as we've traditionally viewed it for higher education. They are (1) regional and discipline-based accrediting agencies, (2) college administrators, and (3) college faculty. In addition, other customers who typically play an internal or external role depending upon their level of involvement with an institution are community organizations, government agencies, foundations, private agencies, and taxpayers.

Ensuring a Systematic Approach

Deming and Juran view an entire system in need of continual improvement

The notion of a system is prominent in the writings of Deming (1986), Juran (1989), and others involved with developing TQM approaches. They view the entire system as in need of continual attention if improvements are to occur for any one of its parts. Systems theory focuses on processes—their inputs, outputs, and feedback—and the emphasis on the interdependency of these parts (Stimson, 1989). Checkland (1972) defined systems theory as the "complex grouping of human beings and machines for which there is an overall objective" (p. 91). Applied to education, systems involve the interrelated workings among people, processes, products, and other phenomenon for the purpose of achieving goals and producing outcomes.

According to Deming (1986), an organization's central activity (e.g., production in manufacturing or instruction in community colleges) must be viewed from a systems perspective. If any one part of the system breaks down, quality is jeopardized. He explains that constant improvement of quality must be pervasive throughout an entire organization from the time materials enter until the time they reach the customer. Products and services must constantly be redesigned for the future. "It is this customer-driven, team-fueled, and even-keel approach to business that forms the basis for the constancy of purpose that Dr. Deming is urging" (Scherkenbach, 1986, p. 10).

Deming believes it is the responsibility of the institution to design a system that anticipates customer needs on an on-going basis. Yet,

he also contends that customers are largely unaware of what will constitute their future needs. Therefore, an important responsibility of organizations is to use research and development to create innovations that can address and even produce future customer needs. Innovation occurs through change in products, processes, and policies. Deming explains that "the moral is that it is necessary to innovate, to predict needs of the customer, to give him [sic] more" (Yates, 1992, p. 21). The importance of Deming's perspective for education is to create systems and processes that guide instructional innovations and to continuously measure how they relate to student outcomes.

Measuring for Continuous Improvement

The threshold for quality is continually raised as customers receive better products from the institution

A fundamental concept of TQM is that outputs are never good enough; the threshold for quality is continually raised as customers receive better services from the institution. On-going measurement is required to determine how a process is working and to make improvements when problems occur. This happens through use of measurement indicators that are extremely sensitive to whatever produces or impedes high quality end results (e.g., student outcomes in education). "The central concept in applying statistics to measurements is that every measurement is made in the context of a measurement system. A measurement system includes not only the object to be measured and the measurement equipment, but also the procedure and context of measurement (Coleman & Stein, 1990, p. 35). Deming believes that by understanding how variation occurs in the context of processes, products, or systems, it is possible to make improvements. The theory of variation is the foundation of Deming's management philosophy; his desire to reduce variation in the way processes—*not* people—function within the organization is a part of each of his fourteen points (Joiner & Gaudard, 1990). His purpose is not to reduce variation to the point of stagnation but, rather, to ensure a minimum and maximum level of quality in all products and services.

In the application of measurement to service organizations, such as educational institutions, the ability to identify and manage quality improvement through the use of group processes, tools, and problem solving plays a critical role in measuring for continuous improvement. In discussing the implications of TQM for outcomes assessment, Seymour and Chaffee (1992, p. 26) explain that "data are part of a diagnostic process, not an accountability weapon." Therefore, the systematic use of measurement through both quantitative and qualitative methods can inform further measurement for determining outcomes for students.

Involving People in the Entire Process

The fifth and most fundamental concept of TQM is that quality improvement must be accomplished through the knowledge and dedication of people employed within the institution. While ideas for innovation can come from internal or external customers, the actual effort of carrying out quality improvement and process management activities is accomplished by those employed *within* an organization. Theories regarding participation and employee involvement are based on the belief that "employees will take more pride and interest if they are allowed to make meaningful contributions to their work and influence decisions made about it" (Aubrey & Felkins, 1988, p. 1).

It is through collective decision making, where each person's expertise is recognized and valued, that organizations are enabled to make improvements. Typically, responsibilities are differentiated depending upon where an individual is employed in the institution but not to the extreme that roles are differentiated as they are in bureaucratic organizations. Rather, senior administrators may be involved in policy making, and mid-level administrators may also influence policy as well as set goals and specify performance indicators. Front-line workers may be involved in determining performance indicators, monitor how these relate to customer needs and expectations, and feed this information back into the system for others to use.

A quality infrastructure touches the entire organization and ensures that work processes are in line with instructional goals

Altogether, an institution's employees create a quality infrastructure that touches the entire organization and ensures that all work processes are operating in line with the institution's goals for continuous quality improvement. Employee involvement at this level requires extensive training so that everyone in the institution can acquire skills and knowledge regarding the quality process. Employees are trained in how to use group processes, problem solving, quality tools (e.g., brainstorming, cause and effect analysis, pareto analysis), and research and statistical analysis techniques; and they are provided with organizational, individual, and team leadership skills. The idea of involving teams in the workplace evolves from the need to facilitate employee involvement to capture expertise for making quality improvements.

How TQM Relates to Outcomes Assessment

While difficult to generalize, a comparison of TQM to educational outcomes assessment approaches such as performance assessment or value-added assessment reveals that TQM is more comprehensive in its approach and more highly focused on evaluation for the sake of improvement than for the sake of accountability. Accountability

TQM is highly focused on improvement; yet, it creates information needed for accountability

to customers is a necessary element of the TQM approach, however, it is not all encompassing. Without a doubt, *improvement* is the key concept. In the view of Seymour and Chaffee (1992),

> Assessment shifts the focus on quality from inputs to outputs, seeking to measure the extent to which educational programs produce intended results: adequately educated graduates. This narrow focus onstudent outcomes, popular among states and boards, may satisfy the demand for accountability. But assessment, if done as part of a larger quality improvement effort, also can aid institutional effectiveness." (p. 26).

TQM shifts assessment to viewing outcomes as evidence of the effectiveness of the whole system. To understand the parts requires an understanding of the whole. Therefore, the focus of assessment must be on indicators of performance of the system's key work processes and how each contributes to end results. By looking at the whole, including measures of student outcomes, data can be fed back into the system to make improvements, as well as to address accountability issues. In a fully-functioning TQM system, the entire institution is dedicated to this effort.

Juran's quality-planning road map applies measurement to all levels of the system

A quality-planning road map designed by Juran (1989) illustrates this approach (Figure 1). Measurement is applied throughout the system, not just to customer needs or product features. Measures are also applied to process development and data generated are fed back into the system at all levels.

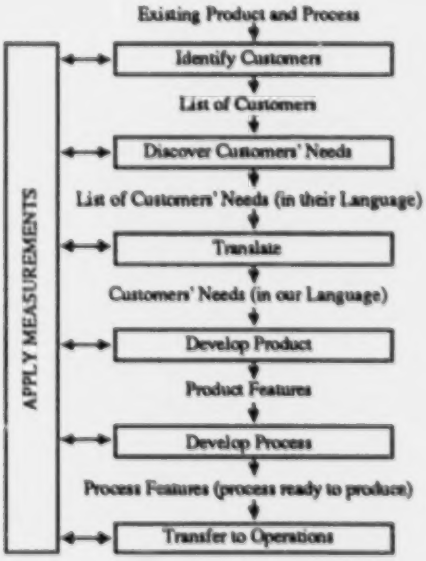

Figure 1. Juran's quality-planning road map (Juran, 1989)

Developing a quality measurement system is pivotal to understanding the workings of the entire system

A measurement approach that focuses on the entire system was developed by Rummler and Brache (1990). Their conceptualization involves developing a quality measurement system to

- identify significant outcomes of the institution, its processes (e.g., counseling and instruction), and its jobs (e.g., instructor, dean, and president);
- identify critical dimensions of performance (e.g., accuracy, relevance, timeliness, and cost) for all significant outcomes;
- develop indicators for each critical dimension of performance; and
- develop measures and standards for each indicator.

Note that the system does not focus on end results or student outcomes alone. It includes these measures, of course, as pivotal to understanding the workings of the entire system. However, the approach of Rummler and Brach goes well beyond end results to measuring outcomes of jobs, processes, and the institution as a whole.

Implementation of TQM

Juran's eight prerequisites provide guidance for implementation of TQM

Juran's eight prerequisites for strategic quality management (SQM) provide a model for implementation of quality improvement and process management approaches. The eight prerequisites Juran (1990) employs are

1. Provide leadership from executive staff
2. Establish the quality vision and policies
3. Establish broad quality goals
4. Deploy the quality goals to all levels of the organization
5. Provide the needed resources, including training
6. Establish measurements
7. Review performance regularly
8. Revise the reward system to give adequate priority to quality improvement

Provide leadership for TQM throughout the institution

Kouzes and Posner (1990) have pointed out that it is the primary contribution of leaders to recognize and support good ideas of front-line workers and "challenge the system in order to get new products, processes, and services adopted" (p. 8). It is the responsibility of leaders at *all* levels of the institution to become involved in implementation of TQM and to formulate a vision and communicate openly and enthusiastically about it. It is the job of senior leaders to support TQM with fiscal, material, and human resources to ensure that it is implemented fully.

A vision of the institution's beliefs about quality and policies to support them are essential for unifying people and creating enthusiasm and a sense of importance. The development of a shared vision and goals for TQM requires personal commitment by every employee to thinking about how one feels about ideas and repeatedly engaging in conversation to express those ideas until consensus is reached. Once a vision and policies for TQM are adopted, it is critical for an organization to examine how they relate to other institutional policies and practices and to ensure congruence among these policies.

The next step is to establish and prioritize goals for TQM. These goals may start as a "wish list" generated by all employees of an institution. However, this list must be paired down and prioritized to create a master list of quality goals for the institution. To be effective, these goals should be stated in specific, quantifiable terms.

Deployment of quality goals moves TQM into the hands of people who can implement it

The idea behind deployment of quality goals is to move TQM into the realm of responsibility of people who can implement it in their day-to-day work processes. Through quality improvement teams, process management teams, and other similar problem-solving groups, employees can become actively engaged in TQM. Of course, participation by all employees in TQM requires a clearly specified organizational structure for the system as well as open lines of communication throughout the institution.

TQM cannot be implemented effectively without a commitment of resources in people, time, materials, and sometimes even facilities. Training in the use of teamwork, problem solving, and measurement are crucial to making TQM work effectively in an institution. As employees become increasingly sophisticated in their use of TQM processes, opportunities for further knowledge and skill are required. Therefore, while the opportunity exists to improve efficiency and reduce costs in some areas of the institution, other costs are sure to rise, making a long-term commitment necessary to making TQM of value in an educational institution (Keller, 1992).

It is important to use measurement to ensure that TQM is meeting its intended goals. A ten-step strategy for carrying out measurement of the effectiveness of TQM is described by Kirby and Bragg (1992). This strategy involves documenting the goals of TQM, building on existing measures, using qualitative and quantitative data collection

methods, and continually refining measures to reflect higher standards of performance.

On-going review and revision of reward systems is crucial to TQM

On-going review of performance is critical to establishing an effective TQM approach. Reviews should focus on determining the degree to which quality goals and outcomes are being met and improved upon. When problems arise, feedback should be provided to individuals who can modify the system to ensure quality improvement.

Many educational institutions employ reward and incentive systems that contradict the TQM philosophy. These may include tenuring of faculty, merit pay for faculty and administrators, and competitive grading of students. New reward systems must be developed to provide incentives that motivate employees to manage work processes consistently with the goals of TQM and to ensure that high standards are obtainable by *all*.

Implementation Issues

TQM is being implemented to improve educational systems and to meet accountability demands

In a limited capacity,TQM is increasingly viewed as a potential approach to improving educational systems and meeting accountability demands (Bemowski, 1991; Bonstingl, 1992; Brandt, 1992; DeCosmo, Parker, & Heverly, 1991; Keller, 1992; Litten & Hall, 1989; Miller, 1991; Seymour, 1992; Seymour & Chaffee, 1992; Spanbauer, 1992). In 1991, Axland identified fourteen community and technical colleges involved with TQM of which sixty-four percent were implementing TQM within their own administrative units. Slightly less than half of the institutions were offering TQM courses in management or technology curriculum areas. Even fewer were developing curriculum to prepare individuals for occupations created by the quality movement (e.g., quality consultants and statistical process control (SPC) technicians). Consequently, whereas TQM appears to have a foothold in a few institutions, it seems it has a long way to go before being recognized as common practice in the majority.

As educational institutions move forward with implementation of TQM, issues are being raised. Some issues pertinent to TQM implementation in postsecondary education are suggested here, although it is premature to offer solutions. The purpose of raising the questions is to stimulate discussion about TQM in order to assist institutions to consider the realities of TQM implementation.

Implementation Issues

- How can a postsecondary institution make TQM fit within existing management and evaluation systems without losing the integrity of traditional approaches?
- Is TQM only applicable to administrative and support processes? What does it offer teaching and learning processes?
- How can an institution handle the extensive requirements for education and training about TQM of its own staff?
- Where will institutions find the time to involve employees in quality improvement activities?
- When the needs and expectations of different customer groups are in conflict, which groups get priority?
- How can an institution move to a focus on processes when traditional accountability demands force it to differentiate programs (e.g., evaluating vocational or transfer programs rather than processes associated with both such as guidance or registration)?
- Can efforts to control process variation impede creativity and responsiveness and an institution's ability to address increasingly diverse student needs?
- How can an institution avoid assessing what's easy to measure?
- With increasingly limited resources, who will pay for TQM?

TQM at Fox Valley Technical College

Of the several postsecondary educational institutions that have implemented TQM, Fox Valley Technical College (FVTC) in Appleton, Wisconsin, is probably one of the best known. Fox Valley embarked on a quality journey in 1985 when a local business representative suggested the college provide training in quality management, specifically in zero defects management. After researching the fundamental concepts of quality and investigating how local business and industry was getting involved, the college's president, Stanley Spanbauer, and administrative staff set out to

understand what the quality methodology would entail for FVTC (Spanbauer, 1992).

During 1985, the College was awarded a small grant from Wisconsin's office of Vocational/Technical Education to design an introductory quality and productivity curriculum for potential use across the state. In addition, a college-level task force along with a study by Jo Hillman, FVTC executive assistant, recommended the college deliver curriculum offerings in quality and productivity for local business and industry. In 1986, Spanbauer approached the college's board for support of a three-year, $60,000 proposal to implement a quality improvement process at FVTC. Spanbauer has recently written about this experience, "To my surprise, there were only a few questions after my presentation, and the board endorsed the initiative. Our journey in quality had begun!" (Spanbauer, 1992).

A sixteen-step quality improvement model incorporates the best of several TQM experts, according to FVTC staff

Since that time, FVTC has developed and refined its quality improvement process into a sixteen-step activity model which its staff thinks incorporates the best of several TQM experts. The sixteen steps follow:

1. Demonstrate management commitment
2. Establish a total quality leadership council
3. Determine the cost of quality
4. Provide education and training
5. Identify roles and establish performance requirements
6. Implement a quality communication system
7. Measure and set goals
8. Identify and eliminate problems
9. Research and develop new initiatives
10. Create a structure for employee initiatives
11. Establish accountability
12. Launch a customer revolution
13. Recognize, reward, and celebrate
14. Conduct quality audits
15. Link to the community

16. Strive for continuous improvement (Spanbauer, 1992)

Four elements of TQM are of importance to this discussion about FVTC's approach

Four elements of the quality improvement process are of particular importance to this discussion. First, dealing head on with the issue of education and training, FVTC continues a strong commitment to educating its own staff in quality principles and methods. During Phase I of TQM implementation, every employee received twenty hours of quality awareness training. Now, during Phase II, all employees receive thirty-six hours of training, especially in the areas of process improvement and management and statistical process control. This training is provided by the college's own Quality Academy.

Phase II training is offered to groups of personnel who have similar jobs and responsibilities. All groups receive training in team building, process management, problem solving, and customer service; the college mission, purpose and directions; and quality review concepts. In addition, each personnel level has major emphasis areas: managers receive intensive training in process improvement and statistical process control; faculty are instructed in teaching effectiveness, outcomes assessment, and classroom management; and service and support staff get instruction in customer service.

The second element involves the structure of TQM at FVTC, specifically the use of a total quality leadership council. Individuals are elected to the council for one-, two-, or three-year terms. It is comprised of three administrative staff, three support staff, and three faculty in addition to President Spanbauer. Established fairly recently, the council helps to monitor the quality improvement process and develop a structure for its continued operation. The Council's current purpose is to promote the quality initiative and ensure its effectiveness for the entire institution.

Third, an important focus of the FVTC's quality initiative is to improve it's processes, products, and services. Quality and process improvement are addressed on several levels. Directly accessible to students—FVTC's primary customers—but available to all of FVTC's internal and external customer groups are comment cards that provide a means of reporting going right or wrong in any aspect of campus life. Since these cards are strategically located on campus and picked up two or three times per week, the College has a direct and anonymous mechanism for monitoring and managing customer satisfaction. Focus groups are also used to collect data on student needs and expectations.

In addition, problem-solving teams are formed within units and across the campus to enable employees to take corrective action when problems are detected. Teams directly confront problems that can potentially disrupt work processes and ultimately jeopardize students' opportunities to obtain positive outcomes. Whereas serious problems can be escalated to higher levels, FVTC finds that

eighty percent of its problems can be resolved by these front-line problem-solving teams (Bemowski, 1991). FVTC identifies eight quality elements as the basis for its quality initiative:

- human resources
- curriculum and instruction
- goal setting
- use of technology
- marketing
- customer service
- management
- trustee/board

For each of these quality elements, the college identifies conforming requirements, measurement strategies, and costs of nonconformance. These elements are used in annual self analysis by staff and faculty to select problems to tackle. Monitoring these elements is important to ensuring continuous operation of the college's quality initiative. Teams of business and industry people conduct audits to determine how well the college is meeting standards set for each element.

Measurement is critical to making improvements and demonstrating accountability

FVTC is committed to using measurement for the purposes of making improvements and demonstrating accountability. This is done by merging quality improvement and process management efforts with the colleges' traditional institutional research activities. Measurement strategies employed at FVTC on a regular basis are presented below. Through this extensive measurement process, FVTC strives to manage and improve quality throughout the institution. To attest to this commitment, the college offers educational guarantees to its graduates and local employers. The college offers retraining or refunds if these guarantees are not met.

FVTC Measurement Strategies

- Indicators of district health (e.g., enrollments, withdrawals, and new contracts) are reported on a monthly basis.

- Graduate follow-up, instructional audits, service audits, needs assessment, information management studies, and financial studies are conducted on an annual basis.
- Organizational climate, student satisfaction, and employer surveys are administered on a biennial basis.
- Community perception surveys, competitive market analysis, labor/business market trends analysis, and other strategies are used on a three- to five-year basis.

When interviewed about visible changes that have occurred at FVTC since TQM was first employed in 1985, Callie Zilinsky, Director of FVTC's Quality Academy, identified several. Zilinsky (1992) explained that the college had undergone a cultural transformation; it had moved from a campus divided by management and labor disputes to one characterized by a real team perspective. She described planning and management efforts that routinely involved committees with representatives from throughout the college.

Second, Zilinsky felt there had been skill building among staff and described FVTC as a learning organization. Consequently, employees were more receptive to learning new things, especially in how to carry out evaluative activities to make quality improvements. She explained that, over the years, staff were showing steady but gradual improvements in comfort with and use of measurement. Finally, she felt that students were being treated differently because of TQM. Through use of comment cards and other problem-solving teams, students were feeling some of the benefits of FVTC's quality initiative.

Challenges remain at FVTC for full implementation of TQM

What are the challenges that FVTC continues to face in its quality journey? Zilinsky spoke of two. First, cost constraints are a reality in higher education, she said. Expressing fears of reduced educational funding, she said, "Cost containment scares me to death." Her concerns were that institutions would use accountability measures currently mandated by funding agencies, resulting in a limited set of measures driving institutional decision making in lean fiscal years. In such times, people and departments are likely to be pitted against one another, rather than working toward a goal of improved quality for the entire institution, according to Zilinsky. She also pointed out there is a tendency for measures to shift from year to year as political emphases change, once again resulting in an uncertain focus for an institution's quality improvement efforts. Particularly strong and committed leadership is needed to ensure that a TQM effort stays on track during difficult financial times, according to Zilinsky.

The other challenge identified by Zilinsky was one described by some others attempting to apply TQM in education. That is, "What

does TQM mean for improving teaching and learning?" She sees these processes as critical to the quality of a college like FVTC and showed concern for limiting TQM to only administrative processes. While she admitted to not having all the answers, she said that she believes there are many, yet untapped faculty resources that will make the connection between TQM and teaching and learning.

Through increased use of group processes involving faculty and students, there will be more exploration of how TQM applies to teaching and learning. The possibilities for improved quality in teaching and learning through application of TQM are largely unknown at this time. However; it seems apparent that improving these critical processes can potentially have the most direct impact on student outcomes. Advancements in assessment approaches to measure improvements in teaching and learning represent the promise of TQM for education.

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Chapter 3

Assessing Student Success

C. Michael Harmon

Overview

One challenge of outcomes assessment is to create an environment in which assessment contributes to the development and maintenance of institutional effectiveness and student success. One way to accomplish this is to develop an institutional climate in which student success is seen as an important goal and then to gear the function of all elements of the institution to meeting this goal. Outcomes assessment is an important part of this effort. Without ownership by all members of a college, outcomes assessment policies will not be fully implemented. This chapter looks at how one college is implementing this process to ensure institutional and instructional quality.

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Institutional Effectiveness = Student Success

An important measure of institutional effectiveness is student goal attainment

Increasingly, an important measure of institutional effectiveness at community colleges is whether students are able to successfully meet the goals that inspire them to attend the institution. For some faculty and administrators, emphasizing student success requires making a fundamental change in operating paradigms. Traditionally, many postsecondary educators have operated on the premise that students have the right to take any class and to pass or fail that class. Some have even felt that a high failure rate is necessary to achieve high standards (Dressel, 1961).

The student success paradigm operates from a vastly different perspective. Borrowing from the principles of Total Quality Management (TQM) and other quality initiatives, it sees the student as a customer and the college as a provider of services. Consequently, student success focuses on identifying student goals and devising a course of study and a program of support services that enables students to meet their goals and then monitoring students' progress toward meeting those goals. Exit interviews or other means of assessment may be used to determine whether individual student's goals were met.

Student success requires support and reinforcement from *all* college employees

The climate needed to support student success does not develop without effort and student success cannot achieve its full potential without broad-based institutional consensus. The process is time consuming and requires constant support and reinforcement beginning at the highest levels of administration and extending throughout the entire institution. Faculty, administrators, and clerical personnel all have direct contact with students and other stakeholders and influence their perception of the campus. So, too, do cafeteria workers, maintenance and custodial workers, security officers, and others. Successful implementation of the student success paradigm requires the involvement of all college employees.

Santa Fe Community College

One college that has implemented the student success model is Santa Fe Community College (SFCC) in Santa Fe, New Mexico. Established in 1983, SFCC set out to implement this model even before it opened its doors. This, some practitioners have said, made it unusually easy for college administrators to put into place any type of program they wanted; this institution had no inertia to overcome. This might well be true if all of their employees were novices when they were hired. They were not. And while efforts were (and continue to be) made to hire staff that would be receptive to this

approach, some veterans came into the program with serious philosophical reservations about its efficacy and propriety.

To the extent that the inertia to be overcome rests not in the institution but in the paradigms used by its employees, SFCC began from the same starting point as any other institution. Indeed, other older institutions—for example, Jacksonville Community College in Jacksonville, Florida—are developing similar programs.

Background on Santa Fe Community College

Santa Fe Community College is an open admission, comprehensive public community college and is accredited by the North Central Association's Commission on Institutions of Higher Education. Its fall semester 1991 enrollment included 3,552 (1,131 FTE) credit and 2,628 non-credit students. The college also served 2,200 adult basic education students (Santa Fe Community College, 1991b). Nearly sixty-five percent of the credit students were female fifty-two percent were white, forty-two percent Hispanic, and three percent Native American. Part-time (less than twelve credit hours) nondegree-seeking students accounted for seventy-three percent of the student body, followed by part-time degree seekers (14%), full-time degree seekers (7%) and full-time nondegree seekers (5%). Academic courses accounted for fifty-five percent of the 16,965 credit hours taken by credit students. Vocational courses accounted for twenty-six percent of the total, with developmental studies providing the remainder (New Mexico Commission on Higher Education, 1991).

Outcomes Assessment at SFCC

Outcomes connect student achievement to college mission

The SFCC approach to outcomes assessment connects student achievement directly to both the college's mission and specified learning objectives for each discipline, course, and program. Achievement is measured while the student is enrolled at the college and after the student leaves the college. This practice allows the college to assess the extent to which it actually teaches what it says it teaches and the extent to which students actually learn what is taught and what they need to know to meet the goals they have set for themselves.

For example, course success and correlational studies of student achievement in math and English courses are used to ensure that specified competencies are, in reality, being acquired while the student is in attendance. These studies also define the degree to which learning objectives are achieved by students individually and collectively in their classes. The degree of success experienced by students as measured by criterion referenced exams becomes a quality benchmark for both the college and the individual student

and allows the college to be confident of the quality of its course offerings and curriculum sequence.

The college also measures student success after enrollment concludes. Studies at SFCC show that students who transfer to a four-year college tend to maintain or improve the grade point average they earned at the community college. Further, SFCC transfer students tend to perform as well as or better than the receiving school's native students, as measured by grade point average (Santa Fe Community College, 1988b).

Studies also show that vocational program completers do well on licensure exams (Santa Fe Community College, 1988a; 1991a) and that graduates of programs leading to licensure have a ninety-eight percent job placement rate. Overall, ninety-two percent of vocational program graduates are employed in their area of training, and employers express "a high level of satisfaction with the training and education of SFCC students" (Santa Fe Community College, 1988b, p. 4). This satisfaction is reflected in the wages earned by SFCC graduates. The median income of the college's full-time, employed graduates during the period of the study was forty-eight percent higher than the Santa Fe per capita income (Santa Fe Community College, 1990).

Student Outcomes Studies

Regular reviews tied to outcomes-related goals are central to the student success model

That these statements can be made and supported is a consequence of the college's Student Outcomes Study (SOS) program. Through these studies, the institution regularly reviews the progress it is making in meeting its outcomes-related goals. It is important to note that SFCC has neither an institutional research department nor a budget for outcomes assessment; all assessments are done by faculty and administrators in addition to their other duties and are funded through the various departments.

Published SOS policy guidelines specify the types of outcomes that are to be examined on a regular basis, the frequency with which the studies will be conducted, and the departments that are responsible for completing the studies.

Annual Studies

- Graduate follow-up and an employer follow-up, conducted by guidance services

- Success rate and withdrawal rate analysis of students in selected courses, conducted by the arts and sciences department
- Final grade correlational study of selected courses, conducted by the arts and sciences department
- Licensure exam success rate study, conducted by the business and management department
- Withdrawal report, conducted by the Admissions and Records Office

Every two years the Admissions and Records Office also conducts a study of transfer students. A biennual student opinion survey is also conducted. The SOS also includes the option to conduct additional one-time, annual and biennual studies as needed. A time table has been adopted to ensure that each component of the SOS is completed in a timely manner.

SFCC'S Instructional Program Review Process

A Phase I program review measures outcomes of instructional programs

Outcomes are also identified and measured through the instructional program review process. Every other year, each degree and certificate program receives what the institution calls a Phase I Program Review. This is a routine process that is a part of the college's instructional management system. Factors considered include

- the program's need/mission statement
- program course enrollments for the past four semesters
- direct and indirect credit hour generation for the past four semesters
- demographics of students majoring in the program for the past two semesters
- the cumulative number of students who have graduated from the program
- the number of students who graduated from the program during the last academic year
- the availability of faculty

- the full-time/part-time faculty ratio
- the cost of the program as compared to similar programs in the state and region

The review is conducted by the appropriate division head, and a summary is reviewed by the Dean of Instruction.

A Phase II program review indicates areas for improvement

If the Phase I review indicates areas for improvement within the program or if more information about the program is needed, the Dean of Instruction appoints a Phase II Program Review Committee. The committee is composed of an instructor from the program or the program's division head, a full-time instructor from another program, a student in the program, a member of the program's advisory committee or an external consultant, and an ex-officio member from the college's information services staff.

The Phase II Program Review included assessments of the following:

- student satisfaction with the program
- placement rates
- the quality of the curriculum
- the credentials of the faculty
- the instructional methods used within the program
- the program's facilities and equipment
- the sequence and timing of course offerings
- student satisfaction with support services
- the continuing need in the community for the program and/or training

The Committee's report to the Dean of Instruction details program strengths and weaknesses and recommends actions to be taken.

Institutional Effectiveness and Student Success

Outcomes that are measured directly relate to either student success or instructional effectiveness at the individual student and program

levels. SFCC's indicators of institutional effectiveness are typically aggregates of student and program outcomes.

Students develop their own definition of success as a basis for outcomes assessment

Ensuring that students successfully meet their goals is an integral part of the college's approach to outcomes assessment. SFCC has purposefully avoided developing an institutional definition of success. Instead, students entering the college are responsible for defining what success will mean for them. Faculty, staff, and administrators then collectively act to support the student in meeting these goals.

The student success model provides the structural framework within which this policy operates. Under the model, student success may be defined as

- improving job skills,
- acquiring transferable credits,
- completing a degree or certificate program, or
- personal enrichment.

Once a student has defined what outcome(s) will be necessary to achieve success, there is a mandatory advising session and orientation program in which guidance personnel and the student agree on the specific strategies that will be used to meet the established goal(s). For some students, the next step is course selection and registration. Others may first be offered special assistance through a variety of programs, including tutoring, career counseling, basic skills assessment, and financial counseling.

Safety Checks

Safety checks are initiated to assist students in meeting their goals

Once the initial registration period ends, the first of two "safety checks" is initiated. Students who applied for admission but did not enroll are contacted by telephone to see if their failure to enroll was caused by a factor that the college could have helped them overcome. Students with remediable problems would be encouraged to take advantage of the late enrollment period. Any student whose class was cancelled or who failed to attend the first meeting would also be contacted by telephone so that options available to them could be discussed.

The second level of safety checks is called the "early alert" system. Designed as an intrusive approach to problem solving, the faculty and counselor collaborate on assuring early student success. Attention is given to attendance patterns, proper course placement,

learning styles, and similar issues. If absenteeism or course problems are noted, the instructor and counselor immediately intervene through direct contact with the student, referrals, and follow-up.

An institution-wide check takes place for students on probation and for all students with a "D" or "F" at the midterm. These students also receive a follow-up letter from the college and are reminded that their counselor is available to help them work through personal and academic problems. They may also be advised that they will be placed on academic suspension if they do not improve their grades during the second half of the semester. In addition to offering advising and counseling, the safety check invites students to attend successful student seminars, however attendance is not mandatory. These seminars are designed to provide fairly individualized assistance to small groups of students with the goal being to provide whatever is needed to help them be successful.

Fostering Teaching Effectiveness

Teaching effectiveness enhances student success

The college sees fostering effective teaching as a primary means of enhancing the likelihood that students will experience success. Toward this end, faculty are encouraged to develop teaching styles that

- provide students opportunities to engage in critical thinking,
- ensure effective communication,
- encourage a positive classroom climate,
- provide for effective and efficient time and resource management, and
- utilize a variety of teaching methods.

Staff and organizational development focus on contemporary issues

Faculty are also encouraged to maintain and display a knowledge of contemporary issues and developments within their fields. The college employs a director of staff and organizational development to assist in the development, maintenance, and monitoring of these efforts. Through the director's office, the college offers approximately seventy in-service activities each year and faculty participation is strongly encouraged.

Instruction is centered on a competency-based curriculum that ensures similarity between courses. Course-level outcomes are specified in the course syllabus. At this level, approaches to assessment vary among the courses and, to a limited extent, between instructors. In addition to traditional written exams, assessment

processes include comprehensive projects, portfolios, and exams conducted by panels of experts.

SFCC'S Outcomes Committee

Studies designed and implemented by an outcomes committee provide an additional level of assessment

Most outcomes assessments above the course level are conducted through studies designed and implemented by an outcomes committee. This group is composed of faculty and administrators from the instructional services and student services divisions. Appointments to the committee are made by the college president, who largely relies on recommendations from the deans and division heads.

Efforts are made to ensure that the committee always has a member with a strong research background, at least one faculty representative, and a balanced mix of personnel from the various divisions. The current committee is composed of

- one instructor
- the directors of two administrative offices
- three division heads
- two deans

One of the deans is the committee chair. The president and the dean of instruction, who was a previous committee chair, serve as ex-officio members.

The outcomes committee is responsible for overseeing the completion of the various mandatory outcomes studies listed above as well as any special studies needed to gather information on a point of interest. When the committee was first formed in 1983, almost all studies were designed independently. Since that time, a research format has been established and is applied consistently to give a predictable structure to the reports. Reports typically involve hypothesis testing and/or descriptive research. When appropriate, they also include recommendations for action to be taken based on the findings.

A study examining the effectiveness of developmental classes in preparing students in need of remediation for regular college level math and English classes is representative of other studies conducted by the outcomes committee. Research began with the hypothesis that students who took developmental classes before they took a college level class would have a success rate at least as high as the students whose first math or English class was at the college level.

Grades for students in the two groups were culled from the college's database and examined using a chi-square test. The English study showed that students who received remediation performed as well as those who had not needed remediation. The math study showed that those receiving remediation subsequently had an even higher success rate than those who had not needed that service (Santa Fe Community College, 1989b).

Uses of Outcomes Study Reports

Study reports are internal working documents, but not for public use

Once an outcomes study is completed, the results are forwarded to the appropriate division head, program personnel, the dean of instruction, and the administrative council. The council is composed of the president, the four deans, the director of planning and development, and the director of community relations. These persons may elect to share the study findings with other college personnel; however, the findings typically are not released to the public. Rather, they are considered to be internal working documents.

If deficiencies or areas for improvement are uncovered during a study, the study serves as a basis for making the necessary adjustments and assessing the results. A SOS (Student Outcomes Study) undertaken to review the performance of Santa Fe Community College nursing students on the NCLEX-RN national nursing licensure exam illustrates how this process works.

In 1989, eighty-five percent of the Santa Fe students who took the NCLEX-RN test passed it; this was the same as the national average. In 1990, the college's pass rate dropped under seventy-four percent while the national pass rose to eighty-six percent. This decline and the subsequent SOS study led to a series of recommendations designed to increase student performance on the test. These included strengthening the curriculum in general, improving specific areas of instructional weakness identified in test summaries, enhancing student study skills and test preparedness, and improving monitoring of each student's academic performance. Subsequent to the implementation of these changes, the college's NCLEX-RN pass rate rose to one-hundred percent (Santa Fe Community College, 1991a).

SOS findings also influence college policy decisions. At one point, administrators hypothesized that students who registered for classes during the late registration period did so because they had not made adequate preparations for the upcoming semester. Such preparations might include obtaining financial aid, working out

transportation schedules, and arranging personal time to accommodate the demands of going to school. Students who had failed to make these preparations were seen as potentially high risk students. Given the college's emphasis on student success, it was thought that these students should be advised to sit out a semester while they made the necessary arrangements. To encourage this, elimination of the three-day late registration period was proposed.

An outcomes study revealed, however, that the academic performance (grade point average, completion rate, and continuation rate) of late registrants was similar to that of all other students. The study also found that students who registered late for classes typically did not do so for the reasons anticipated. Rather, these students were typically signing up for classes that met on an irregular schedule. Because it was found that eliminating the late registration period could prevent students from signing up for these classes, the proposed policy change was not enacted (Santa Fe Community College, 1989a).

Although SOS are internal documents, the college often chooses to report the findings to the public. Findings typically are reported through publications designed for key stakeholder groups including students, employers, receiving colleges, and the community at large. These publications include a variety of annual reports, recruiting brochures, and a news magazine produced by the college's community relations office.

Implementation Issues

Conceptual and operational issues must be addressed to implement the student success model

Institutions attempting to put into operation a version of the SFCC approach to student success and outcomes assessment must address several conceptual and operational issues. As they evaluate these models from their own perspectives, practitioners typically ask five general questions. In separate interviews, SFCC's president and Student Outcomes Committee members were asked to address these questions. Their responses are synthesized below.

1. Question: How does the institution ensure that the members of each campus unit contribute to the student success model?

Response: Institutional environment is the most important factor in keeping everyone involved in the process. "It's an institutional philosophy," according to Professional and Technical Programs Division Head and Student Outcomes Committee member Shiela Ortego. "Student success is just what we do and everyone knows it. It permeates the institution. . . . It's what we are."

Allowing all personnel to play a role in the Student Outcomes Committee reinforces this philosophy. Committee membership changes each year, allowing most administrators and full-time faculty an opportunity to serve on the committee. Additionally, any employee can request that a study be undertaken. The factually based, nonpunitive approach taken by the committee, the president, and the institution toward these studies makes the SOS model a "user-friendly" process.

2. Question: What are the guiding forces that keep the student success model working?

Four principal factors keep the student success model on track

Response: There are four principal factors involved in keeping the process on track. The first, according to SFCC President William C. Witter, is the institution's commitment to hiring people who are willing and able to work within the model. All persons responsible for interviewing job candidates stress the importance SFCC places on instructional quality and student success. To reinforce the message, the president personally interviews all job finalists before their hiring by the college.

Faculty development is another factor in maintaining the student success model. In a reflection of Witter's belief that "everyone can improve," the college's staff development officer conducts over seventy staff development activities each year. Also, every instructor is evaluated in the classroom once each semester by a peer or division evaluator selected by the director of staff development. A follow-up conference is conducted and recommendations are discussed. The results of these evaluations, which are designed to encourage self-improvement, are not reported to the president.

The third factor in ensuring implementation is the president himself. In this regard, Witter sees himself as both a coach and a cheerleader. As he sees it, his job includes "firing up people all the time" and reminding them of the importance the institution places on student success.

Faculty attitudes are another mechanism that keeps student success at the forefront of institutional philosophy. According to an instructor on the outcomes committee, "We get the message to support student success from above, but we aren't being forced. Everyone is concerned that their program is doing well, that we're preparing [students] for the next level, that we're preparing them for jobs. It's a concern of the faculty in general and the administration in general."

3. Question: What factors should be considered when trying to establish a student success model at an existing institution?

Response: According to Marsha Drennon's, Student Outcomes Committee member and Director of Planning and Development, the most important factor is that the model focus on student outcomes

rather than on faculty performance. While the institution does act to ensure that faculty performance meets established standards, the student success model is not a part of that effort. Thus, it is not threatening to the faculty.

Faculty ownership, according to Shiela Ortego, is another crucial aspect of the model. John Pantano says, "Even though it is a mandate, we are always asked for our input. If we were forced into this model, we would not be so happy with it. But we had input into what we wanted to do from the beginning."

4. Question: How can administrators win over skeptical faculty?

Response: Shiela Ortego believes that the first steps should be to emphasize that the process is not punitive and to reassure the faculty that it does not place their jobs in jeopardy. According to Witter, SFCC maintains a very low employee turnover rate. While this relates in large measure to the care taken to make proper choices during the hiring process, it also documents that student outcomes studies are not used as a rationale for dismissal.

Ortego suggests that a college just developing the process should implement it slowly and with a maximum amount of faculty involvement. She cites SFCC's decision to pilot test the process with willing faculty before it was implemented across the board as an important factor in the program's success at the college. When used by SFCC, this approach gave other faculty a chance to hear and see positive benefits of the program before they became involved with it.

Marsha Drennon confirms that the system's benefits tend to be its greatest selling points. As people are involved in or surrounded by the studies, they see that the process is a proactive tool that they can use to improve their own performance. According to John Pantano, SFCC's SOS model did not gain acceptance overnight. The math and English faculty were the first to buy into it; their success in documenting strengths and identifying and resolving problems encouraged other departments to buy into the process as time went on. Despite their nonpunitive emphasis, Pantano points out that the studies must not "whitewash" areas for improvement. In order to be of value to faculty, the studies must strike an objective balance between these two extreme positions.

5. Question: How can an outcomes committee develop and retain a positive working relationship with the rest of the college community?

Response: One key is that each department retains responsibility for actually conducting its outcomes studies. According to Shiela Ortego, this helps make the process more meaningful to the departments and increases the likelihood that they will use the data. Marsha Drennon points out that studies are done to support

curricular change, to meet grant requirements, or for other internal purposes. The studies are not done as an academic exercise or solely to meet committee needs or external accountability requirements. Instead, the committee assists with and reviews studies that would be needed even if the SOS process did not exist. Deriving outcomes data from department studies also helps keep outcomes from being a "mystery."

Building on the notion that outcomes studies should be demystified, John Pantano suggests that two-way lines of communication between the college community and the committee must be established and maintained. Rotating committee memberships helps facilitate communication, as does disseminating findings among department faculty for review before the report is passed onto administrators. This helps ensure that reports are accurate and allows front-line personnel to be aware of and assume ownership of the results of the studies.

Exporting the Process

SFCC's success model is data-based and issues-oriented but still nonthreatening to faculty and staff

Key points in SFCC's student outcomes model are that its studies are

- on-going,
- brief,
- practical,
- issues-oriented,
- data-based, and
- relevant to the daily work of educators.

Further, the model operates within an environment purposefully constructed to:

- be nonthreatening,
- encourage full faculty and staff participation, and
- encourage effective instruction.

As a consequence of these efforts, which should be replicable at other institutions, the student success model has been fully integrated into daily operations at SFCC.

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Chapter 4

Value-added Assessment

C. Michael Harmon

Overview

Although it is a contemporary topic of discussion, value-added assessment has been applied sporadically in American higher education for nearly two decades. The concept of value added originates not in education but in economics, where it is used to describe "the value of [a company's] outputs minus what it buys from other firms" (Weiss, 1981, p. 385). In other words, value added "is the difference between what a firm sells its product for and what it pays for the immediate materials or good it processes..." (Waud, 1980, p. 96).

This chapter examines the meaning of value-added assessment and examines the means by which three institutions are measuring the value added to students by their programs. Readers will see the potential connection of two previous chapters in this book, Total Quality Management (TQM) and Assessing Student Success, to assessing value added.

In this chapter

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Measuring the Value Added by Education

"Value-added education examines changes in students' performance over time."

Education is fundamentally a value-added process. Although it states its goals in such terms as "helping students develop their inherent potential," schooling is essentially "an act of processing people in some way for the purpose of adding value" (Connor & Lessinger, 1983, p. 2). McMillan (1988, p. 564) observed, "Value-added education examines changes in students' performance over time. Students are assessed for entering competencies and then reassessed following the completion of appropriate courses or experiences." The challenge, then, is to define and measure the value that educational institutions add to their students as can be evidenced, ultimately, be program and student outcome.

In its simplest and most traditional form, value-added educational assessment involves the administration of a pretest, exposure to a learning experience, and administration of a posttest. This is one method of measuring the gains—or possibly losses—that students experience as a consequence of involvement with an educational program. At the Terry Campus of the Delaware Technical and Community College, located in Dover, an assessment process that utilizes the pretest and posttest design is being developed and implemented.

In a process coordinated through a newly established Assessment Center, Delaware Technical Community College uses a pretest to measure the abilities of incoming students. The Center is charged with helping the college answer three questions: (1) What should students learn? (2) How well they are learning it? and (3) How does the institution know how well they are learning it? To carry out its mission, the Center first pretests students to determine appropriate class placements. The Center then tracks students and measures academic gains through the use of mid-course assessments and exit tests. Counseling and support services are also provided through the Center.

Earl Roberts, Title III Director at the Terry Campus, describes the college's process as being "heavily based on Deming's philosophy." It is, according to Roberts, designed to look for incremental institutional improvement. That is to say, the value-added assessment process used at the college measures student performance as an indicator of institutional effectiveness. This effort to tie institutional effectiveness to the ability to meet client (i.e., student) needs is, as Bragg noted in Chapter 2 of this document, an integral part of the TQM approach.

Pretest and posttest is generally recognized as the most common means of measuring value added. It has been suggested, however, that pretest and posttest is not the only way that value added can be assessed (Belcher, 1987; Hanson, 1988; Turnbull, 1987).

The most common way to measure the value added by education is to pretest and posttest

Removing this restriction opens the possibility of using value-added assessments in ways that go beyond institutional effectiveness. As Pascarella (1986, p. 75) observed, "If we are willing to accept value-added as a potentially important approach to the assessment of student outcomes, then it behooves us to consider ways in which the methodology of the approach might be enhanced and sharpened."

There are certain prerequisites to being able to successfully measure the value added by higher education. Fincher (1985) has suggested that value-added assessment cannot hope to be a viable methodology unless an institution first agrees on the outcomes that are to be assessed, develops appropriate assessment mechanisms, and focuses instruction to address specific objectives. Elsewhere in this book, approaches related to outcomes conceptualization (see Chapter 5) and performance assessment methodology (see Chapter 7) are discussed. These approaches provide some of the tools for the implementation of value-added assessment.

Early Efforts in Value-Added Assessment

Two institutions, Northeast Missouri State University (NMSU) and Alverno College, were early leaders in the effort to apply value-added assessment in higher education. The objectives of the two institutions and the approaches they chose were, however, quite different. In 1974, the faculty and administration at NMSU set out to devise a system that would allow them to simultaneously "improve the quality of students' learning . . . , husband scarce resources, and . . . be accountable." Value-added assessment was seen as a "unified response to these challenges" (Northeast Missouri State University, 1984, p. 6).

The faculty at NMSU designed their value-added approach to measure the effectiveness of their institution. Early on, this involved a pretest and posttest approach to assessment. The goal was to discern whether the institution had been effective in its educational program. While the institution still relies on value-added assessment, it is generally moving away from a predominantly pretest and posttest design. Today, their approach is evolving to include performance assessment (Rector, 1992). Portfolios and capstone experiences are used in various programs across the campus (Young, 1992).

The faculty at Alverno College in Milwaukee, Wisconsin, devised an approach to value-added assessment that serves purposes quite different from the original intent of NMSU's process. Alverno College has stated that, "We are committed to assess what each student is learning in every course in our curriculum. We are also committed to assessing student competence outside the classroom" (Alverno College Faculty, 1985, p. 4). Because the college focuses its process on documenting student development rather than

demonstrating institutional effectiveness, the faculty rejected the pretest and posttest design from the start, preferring instead to develop and validate performance assessment measures (Loacker, 1992).

As their longstanding commitment to employing their respective approaches attest, the faculty at both Alverno College and NMSU believe in value-added assessment. The faculties at some other institutions have also incorporated value-added approaches into their daily operations. (See, for example, Erwin, 1991, p. 20-23.) However, value-added assessment has largely been ignored by America's postsecondary education system (Kirst, 1991; Smith, 1991).

Current Issues in Value-Added Assessment

Differences of opinion exist about the meaning and implications of value-added assessment

As early experiments with value-added assessment gained attention, so too did the diversity of opinion as to its meaning, implications, and limitations. Hanson drew a distinction between outcomes-based and value-added assessment, suggesting that "the focus of student outcomes assessment is the 'what' of education, and the focus of value-added is on the 'how'" (1988, p. 53). Therefore, according to Hanson, assessment must be partitioned into distinct and potentially competing parts rather than viewed as complementary to the whole system, as is done by the TQM and student success approaches previously discussed in this book. Following Hanson's logic further, however, leads to consider value added to be a longitudinal approach to answering the question, "What kinds of students change in what kinds of ways when exposed to what kinds of educational experiences?" (Hanson, 1988, p. 53).

Belcher (1987) indicated that Hanson's concern about the limitation of value-added assessment was shared by others. Recurrent themes identified by Belcher were that

- value-added assessment emphasizes learner growth, which is not the only important factor for educational programs. Growth, while important, does not imply the attainment of competence, for example.
- value-added assessment causes institutions to change the way they operate by causing institutions to overemphasize measured skills to the detriment of equally important unmeasured skills.
- value-added assessment is often seen as following a standardized pretest and posttest design that may be based on inaccurate assumptions about the nature of learning.

The Relationship Between Value-Added and Outcomes Assessment

Outcomes-based and value-added assessment can reveal "the level of developed competency or talent of the graduates of an institution"

Although Hanson and Belcher contended that outcomes-based assessment and value-added assessment can be two very different things, in practice the difference may be nothing more than a question of what types of change in students is thought to be of value. What is valued by stakeholders is an especially important consideration in educational contexts in which workforce preparation is a primary goal. In these situations, "the employer is really only interested in outcomes—that is, the level of developed competency or talent of the graduates of an institution" (Astin, 1987, p. 94). The degree of change in competence is not likely to be important to an employer if a student has not met specified performance levels.

Perhaps looking at the issue from this perspective, others have seen a relationship between outcomes and value-added assessment. McMillan (1988, p. 565) observed that "experience with value-added education models over the past few years suggests that the emphasis on documented improvement of students' knowledge, skills, attitudes, and other outcomes has had a positive effect on higher education."

The institution's mission statement ultimately drives what is assessed by the institution

The question of value is one that must ultimately be addressed in an institution's mission statement (Astin, 1987). In some cases, an institution may wish to measure changes that are not captured by outcomes statements. In other cases, though, the acquisition of certain pre-specified knowledge, skills, and attitudes is precisely the value that an institution seeks to add to its students. In these instances, where the value added is the acquisition of specific skills gained at the course level rather than those associated with degree completion, value-added assessment and outcomes assessment are congruent efforts. In either event, Belcher (1987, p. 32) points out that "measuring improvement does not replace the possibility of setting a floor by [establishing] exit standards."

The Inadequacy of Measuring Only Growth

That value-added assessment measures growth is an unassailable position. Within this context, Hanson (1988) has identified five conceptual issues that need to be addressed in a way that makes sense for each particular institution. These issues include

- What should be measured?
- When should the measurement occur to accurately reflect student growth?

- Will the assessment indicate how the student changed?
- Can effects found by assessment measure both direct and indirect factors that lead to change?
- Should the assessment measure both direct and indirect factors that lead to change?

The question of what should be measured is central to establishing any outcomes assessment program, including value-added assessments. Some have criticized value-added assessment for placing too much emphasis on growth rather than on the attainment of competence (Manning, 1987). Employers, as was discussed previously, might have little or no interest in whether an employee has skills beyond those needed for employment. Indeed, from the employers perspective, the addition of talent beyond this level might "be superfluous or possibly irrelevant" (Astin, 1987, p. 94).

Measuring growth is of critical concern for postsecondary students who move into the job market before completing programs

According to Turnbull (1987), it is important to measure both growth and terminal competence. This is of critical concern in those instances where postsecondary students enroll in technical curricula, gain skills through the completion of certain career-relevant skill development courses, and move into the job market without completing a degree or certificate program. Here, failure to address both aspects of learning can lead to a situation where an institution that is highly successful in producing a competent work force can appear to be ineffective because of a high non-completion rate.

Providing measures of both growth and terminal competence is well within value-added assessment's capability, countering the perspective held by Hanson and others. Therefore, value-added assessment enables an institution to accurately state its effectiveness from institutional and program perspectives. Establishing benchmarks at critical points in students' educational programs and assessing students in relation to them is one way to meet this goal. Taking this approach will move institutions toward establishing meaningful performance measures and standards and meeting the mandates of Perkins II. (See Chapter 1 for a discussion of current federal mandates).

Value-Added Assessment as a Tool for Change

Change is an inevitable part of life; keeping up with the rest of the world requires that we, too, change. Institutions are required by the federal government, roughly two-thirds of the states, and all regional accrediting agencies to attend to assessment issues. (For further discussion, see Chapter 1 on assessment policies.) This emphasis mandates changes in practice at many institutions. The

Value-added assessment helps make informed decisions that can guide an institution through change

issue is not whether there will be change: it is a given. It is, instead, an issue of determining the basis for the information used to make decisions that guide institutions and programs through periods of change. Value-added assessment provides an opportunity to make those decisions based on information about educational quality (NMSU, 1984).

Astin points out that higher education institutions have traditionally rated themselves on the reputation and/or resources that they have acquired over time. For those colleges who consider reputation to be of importance, excellence is measured according to their ranking in comparison to peer institutions. For those who consider resources to be of paramount importance, factors such as student admission requirements, faculty productivity, physical plant facilities, and financial resources are indicators of excellence. There is no guarantee, however, that excellence in terms of ranking, or resources will lead to educational excellence. Further, some institutions with reputations for excellence in neither area still manage to provide very effective undergraduate education (Astin, 1987).

An effective educational program is the result of many factors, among them good decision making at a number of levels. The faculty at NMSU have written that,

> Sound decisions require judgement and facts. When an institution knows the facts about its impact on student learning, it is in a position to evaluate courses of action in terms of their potential influence on how much students learn. Decisions based on quality are sometimes remarkably different from decisions based on credit hour production. Sometimes, too, improvements are made at the expense of some cherished old myths (1984, p. 48).

Value-added approaches engender change at the program level to ensure students are learning what they need to know

Earlier in this chapter, it was observed that the determination of what is of value in an institution should be directly related to the institution's mission statement. The subsequent construction of an assessment program requires that clear and assessable educational goals and objectives be established (Erwin, 1991; Pascarella, 1986). This in itself is quite likely to engender change within the institution at the program level as instructors adjust their teaching to ensure that students are being taught and are learning what they need to know (NMSU, 1984).

Pretest and Posttest as a Measure of Learning

In both popular and professional literature, value-added assessment has been closely linked with a pretest and posttest design. Hartle (1985) defined value-added assessment as a pretest and posttest process designed to measure both general education and skill development. McMillan (1988) explained that the pretest and posttest design allows for the assessment of changes in competence over time.

Discussing the many statistical flaws inherent in simple pretest and posttest assessment, Hanson (1988) points out that this model may not be a particularly good way to conduct value-added assessment. He recommends instead that causal analysis and hierarchical linear regression models of data analysis be used to fully investigate the extent and nature of change rather than relying on a simple assessment that may include confounding factors.

Alternative assessments such as senior theses or capstone projects can be used to measure the value added by an educational experience

Belcher (1987) also pointed out that while pretest and posttest is one way to measure the value added by an educational experience, it is not the only design available. She advocates that senior theses, or presumably other capstone projects, be retained and used as benchmarks for measuring "varying levels of acceptability" (1987, p. 34). In instances where institutions feel a need to use standardized tests for pretest and posttest measurement of skill improvement, Belcher (1987) proposed that a four-step process be used:

- Administer an entry-level test and use scores for course placement.
- Determine which elements of the curriculum should affect the skill levels measured at entry and collect information on these elements.
- Select an exit test, either the same one used at entry or a more difficult one.
- Conduct early statistical analysis to determine the extent to which entry skills and curricular elements predict exit skills.

If a commercially prepared test is used, it can usually be assumed to have been validated for a specific purpose. However, it remains the institution's responsibility to ensure that it is used for the purpose for which it was validated.

Alverno College breaks away from the pretest and posttest design of value-added assessment by using narrative evaluations that are integrated into the learning process to measure both student growth and competence attainment. That these assessments are qualitative does not diminish their appropriateness. As Patton (1988, p. 75)

pointed out, "[F]or particular outcomes no acceptable, valid, and reliable quantitative measures exist. . . . [T]he state of the art in social science measurement is such that a number of desirable outcome measures still elude precise measurement." These outcomes probably include creativity, self-esteem, and others that are identified as being important to educators, students, employers, and reform leaders.

Reliance on qualitative descriptions of student performance in no way reduces the importance of establishing the validity of the process. The same internal and external threats to validity that Campbell and Stanley identified for experimental and quasi-experimental research also apply to qualitative assessment (Lincoln & Guba, 1985).

Determining the validity of a measure requires understanding the educational assumptions made by the institution

How is validity established? House (1980, p. 249) observed that "as a minimum validity claim, one would expect that the evaluation be true. There are different ideas and methods for arriving at the truth." A valid instrument truthfully represents what it says it represents. Mentkowski and Rogers (1988) contend that any means of determining validity must be appropriate to the educational assumptions made by the institution at which the particular instruments are being used. There is, then, no magic formula for developing institution-specific responses to the challenges of instrument validation.

It is readily apparent that validating performance assessments can be a difficult task. However, vocational educators have a long tradition of measuring student performance through just such measures. Recent research conducted by Mabry (1992) (see Chapter 7) suggests the issue may not be whether such assessments can be conducted in ways that are valid and reliable on a large scale but whether they yield useful information on an individual basis. To address this question, well-established performance assessment approaches used at Alverno College are discussed in the remainder of this chapter.

Assessment at Alverno College

Alverno College is a private, Catholic women's liberal arts college at which assessment is an important part of academic life. The Alverno faculty report that "students vary in their responses to this first encounter (with the college's assessment program), but they all testify to its impact and complexity. . . . Even with a prior visit to the campus, one junior at the college noted, 'It was still really confusing. You have to experience it to really understand the value of it'" (Alverno College Faculty, 1985, pp. 38-39). The following narrative documents their approach to assessment and provides readers with just such an "experience."

Alverno focuses a "value-added" approach on student assessment

It is important to note that while Alverno's assessment process measures the growth that occurs in students over time, there are sharp distinctions between this college's student assessment process and the pretest and posttest notion of value-added assessment described by Hartle (1986) and McMillan (1988). According to Assessment Committee Chair Georgine Loacker (1992), and important distinction is that Alverno uses multiple assessments across time not only from an institutional research perspective but from the student's perspective, to enable her to trace the patterns of her development of ability and to demonstrate her progress.

The generic application of value-added derives from the college's initial assessment of students upon entry into the college and the continuous use of multiple performance assessments to document student growth (Loacker, 1992). The initial assessment typically takes place on a single day, although some students are permitted to spread out the process to accommodate personal needs. During the course of the day, students are assessed and assess themselves in six areas: writing, speaking, listening, reading, computer literacy, and quantitative skills. Writing and speaking abilities are assessed through a letter-writing exercise and a videotaped speech. Skills in the four other areas are assessed through responses given to a series of open-ended questions (Alverno College Faculty, 1985).

One current Alverno student described the day-long assessment process in this way:

> "One day at the beginning, a series of tests was given. A speaking section, a writing section, math; they hit everything. They want to see where you're at, what you're comfortable with in terms of writing and speaking and so forth. Nobody wants to be placed in a class that they're going to be uncomfortable with or nervous with. They want to see where your abilities lie and put you in a comfortable environment, a class where you'll be comfortable and that you're ready for because the classes build on one another."

One of Alverno's most widely recognized contributions to student outcomes assessment is the use of a matrix that defines abilities to be developed and demonstrated by students. In order to graduate, each student must fully meet the criteria in each of the forty-eight matrix cells (Figure 1). The six skill levels in each of the eight areas of ability are sequentially arranged so that developing ability in one cell is a prerequisite for satisfying the requirements of the next cell. While students must demonstrate mastery of each ability, it can be demonstrated in a number of ways and in a variety of courses depending on the program of study. The completion of these cells documents student growth in each of the eight ability areas. Instruction is tied to explicitly stated criteria. One student who had transferred to Alverno from another college observed, "At the other college, they didn't have very specific criteria—read this book and write an essay on it. Here, I was assigned to read a book and given

Figure 1
Alverno College Student Competence Matrix

Level	Communication	Analysis	Problem Solving	Valuing	Social Interaction	Responsibility for the Environment	Effective Citizenship	Aesthetic Response	
1	Self-assesses	Observes	Discerns problems	Identifies her own values	Self-assesses	Relates self and world	Situates self in public contexts	Articulates personal response	General Education
2	Communicates with analytic consciousness	Infers	Formulates problems	Infers implied values	Analyzes groups	Recognizes global interdependence	Compares positions on public issues	Discerns uniqueness of artistic expressions	
3	Uses communication techniques	Relates	Resolves problems	Relates values to scientific and technological developments	Evaluates self and groups	Articulates and emphasizes with global diversity	Publicly employs participatory skills	Relates works to various contexts	
4	Integrates communication abilities	Integrates	Integrates approaches	Applies valuing processes	Performs effectively in groups	Synthesizes diverse perspectives	Initiates public activity	Makes/defends qualitative judgements	
5	Apply communications theory	Establish and use analytical frameworks	Work with others to design and implement a problem solving process	Analyze and formulate a value foundation/ framework	Interact effectively in cross-cultural situations	Generate approaches to global problems	Plan for effective change	Discuss artistic works that reflect personal visions of humanity	Major Areas
6	Communicate effectively	Independently employ frameworks	Solve problems in many situations	Apply personal and discipline values	Facilitate interactions	Help others develop global responsibility	Exercise leadership	Demonstrate the influence of art on your own life	

Note: Adapted from Alverno College Faculty. (1985). *Assessment at Alverno College.*

specific things to look for and write about. The criteria helped me know what I should be doing."

Continuous multiple-method assessment develops a record of student performance

During any course of study at Alverno, assessment techniques include written tests, verbal feedback from the instructor, peer assessment, and self-assessment. Through the continuous, multiple-method assessment of student performance, the College's Assessment Center develops a comprehensive record of performance for each student. It is the ability to use these records to document student learning over time that leads Alverno college to being a pace-setting user of value-added assessment.

Summary

In it's most commonly recognized form, value-added assessment utilizes a pretest and a posttest to measure student growth over time. While standardized tests have traditionally been seen as the preferred means of conducting such assessments, other assessment methods can also be used. These assessments can take any of several forms and their selection should be driven by the mission and goals an institution sets forth for itself and its programs. Although less commonly applied, value-added assessment can be determined through a pretest and continual assessments throughout a student's program. This approach enables an institution to use multiple methods of assessment and to document student learning over time on a continuous basis.

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Chapter 5

Concept Mapping

Thomas E. Grayson

Overview

Once an institution commits to assessing outcomes and determining the value added to each student's repertoire of skills and knowledge, a methodology for conceptualizing outcomes is needed. A new approach that offers promise for outcomes assessment is concept mapping. This process enables diverse groups of practitioners to describe how their programs work and then, based on that collective wisdom, articulate how these programs influence outcomes for participants.

This chapter describes concept mapping, a practical approach to articulating how programs work and identifying program outcomes. Concept mapping is a bottom-up approach and results in a pictorial representation of what practitioners think about how their programs produce outcomes. By using a case study in concept mapping to conceptualize vocational education outcomes at Black Hawk College in Moline, Illinois, this practical approach to outcomes identification is illustrated.

In this chapter

This chapter presents a discussion of the following topics:

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Concept Mapping: Its Theoretical Bases

A picture of practitioners' thinking is the essence of a concept map

Concept mapping has been described as a type of structured conceptualization process that combines group process activities with multivariate analytical techniques to produce a visual representation of the group's thinking (Linton, 1985; Trochim, 1989b). In concept mapping, ideas (i.e., concepts) are described and the interrelationships between them are articulated. The concepts and their interrelationships are then represented in the form of a visual map.

> A concept map is a pictorial representation of the group's thinking which displays all of the ideas of the group relative to the topic at hand, shows how these ideas are related to each other and, optionally, shows which ideas are more relevant, important, or appropriate (Trochim, 1989a, p. 2).

Concept mapping is a clearly defined process (i.e., the process has a clear beginning, middle, and end) which

- has a specific focus on a topic or construct of interest
- involves one or more participants in the generation of ideas regarding the focus of interest and
- is designed to produce a graphic representation in the form of a concept map of the participant stakeholders' ideas and how those ideas are interrelated.

Concept mapping, as defined in this chapter, grew out of a general model of structured conceptualization, which was developed by Trochim and Linton (1986). These researchers first used concept mapping to describe program theory by understanding the causal links practitioners made between the operation of a program and its intended effects on outcomes. Implementation of this model yielded a pictorial representation of the ideas of participant stakeholders.

Practitioners of vocational education prescribe particular courses of action to achieve certain vocational education outcomes. In doing so, they act as theorists. Behaviors, interpretations, and responses to situations represent their view of how vocational education programs are intended to function. Kolb argues, "Theory, an understanding of how program elements fit together and how programs influence outcomes for participants, can and should be built from the ground up" (1992, p. 26). He contends that knowing how programs work is essential to assessing outcomes and improving programs.

The Three-Phase Model

As is shown in Table 1, there are three general phases in the model:

1. Generating the conceptual domain
2. Structuring the conceptual domain
3. Representing the conceptual domain

Table 1
General Model for Conceptualizing Program Theory

1. Generation of Concepts	2. Structuring of Concepts	3. Representation of Concepts
Concepts are created out of thoughts, ideas, intuitions, theories, and problem statements.	Relationships between and among concepts are defined or estimated.	The structured set of concepts is represented verbally, pictorially, or mathematically.

Note: Adapted from Trochim & Linton, 1986

In the first phase of the model, the conceptual domain is generated; concepts are created out of thoughts, intuitions, ideas, theories, or problem statements. Each concept is distinguishable and can be expressed as a word, phrase, sentence, or other text unit. These words or phrases form the basic unit of meaning for the structured set of concepts that are represented verbally, pictorially, or mathematically.

The second phase is the structuring of concepts; it involves a process that defines relationships between and among the concepts. These relationships, when defined, often result in an interpretable and understandable arrangement of concepts.

The third and final phase in conceptualizing program theory requires that the concepts be represented in some fashion. Conceptualization of concepts may be represented verbally, pictorially, and mathematically.

Purposes of Concept Mapping

Concept mapping is a method for structuring participant ideas in an objective form

Concept mapping can provide a methodology for articulating and structuring participant stakeholders' ideas, thoughts, or concepts in an objective form—the concept map. Such a representation is extremely useful in developing program theory, identifying program outcomes and providing feedback to make program improvements. Concept mapping can also be used to guide policymakers, managers, program designers, and administrators in setting policy, conducting operational and strategic planning, and facilitating program planning and implementation.

Concept mapping methodology has roots in theory development, particularly learning theory and program theory development. Learning theorists have used concept mapping to describe how knowledge is constructed (Novak & Gowan, 1984), and program theorists have used concept mapping to describe program components, processes, and outcomes. Program theory can provide "a plausible and sensible model of how a program is supposed to work" (Bickman, 1987, p. 5), and the concept mapping process offers a way to conceptualize and visually represent the theoretical underpinnings of the program under study (Chen, 1990; Trochim, 1989b).

Kurt Lewin once said, "[T]here is nothing so practical as a good theory" (1951, p. 169). Lewin was suggesting that theory and practice should be integrated and that the best use of theory is to facilitate understanding the field or subject under study. Grayson (1992), Kolb (1991), Linton (1985), Marquart (1990), and Valentine (1989) have all used concept mapping to create a framework to plan, implement, and evaluate a wide range of programs.

Concept maps can display major program components as a guide to determining outcomes

Understanding the theoretical underpinnings of a program helps to understand *how* programs can be expected to work before the attempt to evaluate them is initiated. Knowing *how* programs work can aid evaluators in determining what to measure in a program and what characteristics of a program are most important. Knowing *how* programs work can also help policy makers and program planners and managers make informed decisions regarding program policy, planning, implementation, operations, and improvement. As noted by Chen (1990), when a particular program is specified, constructed, and implemented appropriately intended outcomes are highly likely and the credibility of the program is strengthened. Concept maps can display the major components of a program and can be used as guides to determine program outcomes and to assess and improve educational programs. Concept maps can also be used to pictorially represent relationships among program components and to show how these components are linked to outcomes.

Concept maps can influence program implementation and ultimately program improvement

Kolb (1991) suggests another role for concept maps in identifying program theory. Identifying program theory can serve "as feedback to inform and enlighten program practitioners, from whom program theories-in-use originate and [who operate at] the level at which program implementation and program improvement ultimately must take place" (Kolb, 1991, p. 18). Program theory illustrated through a concept map can also provide feedback to inform and enlighten those who created and funded a program. This type of information can lead to improvements in policies that govern funding and implementation.

Concept Mapping Methodology

A variety of qualitative and quantitative methods are used in concept mapping

Concept mapping uses a variety of qualitative and quantitative methods in its procedures. Concept mapping employs

- small group processes to identify ideas on a specific topic of interest (e.g., brainstorming, nominal group techniques, focus groups, and Delphi)
- sorting procedures whose purpose is to group ideas into piles that make sense to the participant stakeholders
- Likert-type rating scales to rate the priority or importance of ideas on a dimension of interest
- multivariate statistical analyses on the sorted and rated ideas in order to create interval-level concept maps that visually represent the topic of interest

After the maps have been created, participant stakeholders are again involved in their interpretation with attention keenly paid to ways the maps can be used.

The Concept Mapping Process

A plan must be developed and facilitators selected prior to conducting concept mapping

It is crucial to develop an overall concept mapping plan prior to conducting the concept mapping process. The organizational context needs to be identified and a facilitator of the entire concept mapping process must be designated. The goals and purpose of a concept mapping process must also be clearly defined; careful selection of participant stakeholders must be made.

Selection of the facilitator is crucial. The facilitator must be familiar with concept mapping technology and, ideally, have substantive

The facilitator must be masterful at leading small groups

knowledge of the context under study. Most importantly, the facilitator must be masterful at leading small group processes. The role of the facilitator is to guide persons involved in initiating the concept mapping process toward reaching their intended goals and purpose. Skills in facilitating a diverse stakeholder group to reach consensus are essential. The facilitator manages the process, whereas the participant stakeholders determine the content, interpret the maps, and use the results.

Based on work by Grayson (1992), Linton (1985), Trochim and Linton (1986), and Trochim (1989b), the concept mapping process involves six basic steps.

Step	Primary Activity	Tasks
1	Preparation	• Select participants • Develop a focus statement • Determine a rating focus • Schedule sessions
2	Generation of ideas	• Generate ideas • Reach consensus on the meaning of statements • Eliminate redundant statements
3	Structuring of ideas	• Rate each statement based on the rating focus developed in Step 1 • Sort and label the statements
4	Computation of maps	• Analyze data and create maps
5	Interpretation of maps	• Prepare maps and materials for interpretation • Interpret maps • Consider ways maps can be used
6	Utilization of maps	• Make plans to put findings from concept mapping into action

Step 1 - Preparation

Selection of participants is an important first step

There are four major tasks in this preparation step. First, participant stakeholders must be selected. All participants are considered experts, and the number of participants should be large enough and diverse enough to ensure that a wide range of ideas are represented. At the same time, the group should be small enough to be manageable and effective in group discussion sessions.

My experience indicates that a group of approximately twenty is manageable yet large enough to generate a range of ideas. Care should be given to how participants are selected, whether selected purposively (Patton, 1980; Stake, 1985) or by random sampling methods. When purposive sampling is used, it is essential to consider selection of participants who

- have experience participating in small group processes
- can articulate their thoughts clearly and assertively in a group setting that involves people representing varying roles and responsibilities
- will accurately represent the opinions of the stakeholder group they represent
- have the analytical ability to categorize and prioritize large amounts of information quickly

Again, my experience suggests that most individuals have little difficulty participating in the process, but some individuals can be overwhelmed by it. Therefore, careful selection of participants is essential.

Second, a specific focus statement for conceptualizing a domain of interest must be developed. Clearly, the focus statement depends upon the purpose of the concept mapping process. The statement should be clearly and precisely stated. In selecting and refining a focus statement it is important to try it out on others. See if it generates the kinds of ideas you are seeking. This actively helps to eliminate any confusion about purpose and ensures a smooth beginning to the small group activity.

For example, if the purpose is to conceptualize a particular program or treatment for the purpose of identifying outcomes, then the focus statement might read, "Generate statements (short phrases or words) which describe what you think the program or treatment ought to be." This type of broad statement will result in the generation of many ideas on what the program or treatment ought to be. Later, when the conceptualized program is displayed in the form of the concept map, the map can be used to generate or identify specific outcomes.

Third, if a relative sense of importance or priority for the conceptualized components of the program or treatment is needed, a specific focus statement for rating ideas should be determined.

Sample Rating Focus

Rate each brainstormed statement on a 1 to 5 priority scale where:

1 = very low priority
2 = low priority
3 = moderate priority
4 = high priority
5 = very high priority

As part of the computation process to be discussed later in Step 4, ratings are averaged for each statement and then are graphically displayed to demonstrate the relative priority or importance between and among the program components.

The fourth task is to schedule generation, structuring, and map interpreting sessions. Typically, one day is needed for the generation and structuring steps and a half day is needed for the map interpretation step at a later date.

Step 2 - Generation of Ideas

Participants generate ideas relative to a focus statement

The facilitator, using small group processes, often brainstorming, reminds participants of the focus statement and instructs them to generate ideas relative to the focus. When using brainstorming, basic brainstorming rules are followed. No censoring of other people's ideas is allowed; every idea must address the brainstorming focus; and routine as well as novel ideas are included.

When the group is finished generating ideas, mutual understanding and consensus on the meaning of each statement is reached and redundant statements are deleted. These statements are then readied for Step 3 - structuring of statements; they are printed on rating forms and on index cards.

As discussed previously, there are ways other than brainstorming to generate ideas to represent a conceptual domain. For example, a set of statements can be obtained from extant documents such as approved program proposals, annual reports, evaluation reports, case studies, interviews, or other types of written documents.

Step 3 - Structuring of Ideas

Ideas are structured by involving each participant in rating and sorting the statements

Structuring ideas involves each participant in two activities that make sense of how the statements are related to each other. The first activity is rating the statements. Once a set of statements on a given focus is generated, participant stakeholders are typically instructed to rate each statement on a dimension of interest such as priority or importance. The dimension of interest is defined by the rating focus described in Step 1.

The second activity employs a card sorting procedure (Weller & Romney, 1990) to obtain information about how the statements are related to each other. Individual participants, using a deck of cards with brainstormed statements listed on them, are asked to sort the statements into groups or piles that make sense to them. When sorting is completed, participants label each of the piles and then record the name of each pile on a separate sheet of paper. The identification number of each statement belonging to each pile is also recorded.

Sample Sorting Instructions

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1. Read through the set of cards and sort them into piles that make sense to you.

2. Place similar statements together into the same pile. Group for similarity, not priority.

3. Create as many piles as you want but don't limit yourself to one pile and don't have as many piles as there are number of statements.

4. There are no wrong or right piles. Each person may find that the statements can be piled or sorted in several ways. Choose the way that seems best to you.

5. Provide a label for each of your piles.

6. Record each pile on a sheet of paper and indicate by number the items belonging to each pile.

Step 4 - Computation of Maps

***The Concept System* is an effective means of producing concept maps**

A general purpose statistical software package which has routines for multidimensional scaling and cluster analysis and a graphics program to plot the final maps can be used to analyze and compute maps. Trochim has written a computer program, *The Concept System* (1989a), for computing maps.

The Concept System averages the rating data and analyzes the similarity sort data. Analysis of data is performed by aggregating similarity sort data (i.e., higher values in cells indicate a higher level of agreement among participants) into a nonmetric binomial matrix, then maps are computed through multivariate analysis (multidimensional scaling [MDS] and cluster analysis) on the nonmetric binomial matrix. See Kruskal and Wish (1978) for detailed discussion on MDS and Aldenderfer and Blashfield (1984) for discussion on cluster analysis. Finally, average ratings for statements and clusters are computed.

Step 5 - Interpretation of Maps

A facilitator guides participants through the interpretation to build understanding and consensus about the final map

Map interpretation includes several steps or activities, all of which involve the participant stakeholders. The facilitator prepares the appropriate materials and maps and then guides the participants through each of the steps. Activities include

1. locating the statements on the map
2. deciding on the number of clusters
3. describing the clusters by size, cohesiveness, location, level of importance to rating scale values
4. naming the clusters
5. viewing the map by regions (i.e., cluster groupings)
6. viewing the map as a whole

Each of these activities differ in length and complexity, and because of group dynamics, the procedures for conducting each step or activity varies. It is important to note that this step requires building understanding about and consensus regarding the final form of the maps. Where disagreement is likely, it is important to ensure adequate time for this phase of concept mapping. Multiple sessions may need to be scheduled to give people time to work through their understanding of a map. The point is that where dissent can be anticipated, participants must not be rushed.

Step 6 - Utilization of Maps

As was discussed previously, multiple reasons exist for using concept mapping. Three are to

- identify and describe program elements
- develop program theory
- plan, implement, and evaluate programs

Of course, an important part of evaluation is the identification of outcomes and that is the use described next in this chapter.

A Case Study in Using Concept Mapping to Identify Outcomes for Vocational Education

The tenets and key components of vocational education can be identified through concept mapping

The National Center for Research in Vocational Education (NCRVE) project staff at the University of Illinois conducted a study to systematically identify and examine the basic tenets and key components of vocational education as espoused and practiced by faculty, administrators, students, and business and community leaders at three postsecondary educational institutions:

- Black Hawk College in Moline, Illinois
- Dunwoody Institute in Minneapolis, Minnesota
- Western Wisconsin Technical College in Lacrosse, Wisconsin

At each site, the tenets and key components of vocational education were identified. Then, they were displayed in the form of a map, which was used as a framework to identify vocational education outcomes. To illustrate how concept mapping can be used to conceptualize vocational education outcomes, this discussion focuses specifically on the concept mapping activities conducted with Black Hawk College in Illinois.

Black Hawk College

Black Hawk College is a comprehensive public institution located in western Illinois on two campuses approximately thirty-five miles apart. The largest of the campuses is housed in Moline. The combined student enrolment at the two campuses is about 7,200

students (Illinois Community College Board, 1992). Sixty-two percent of the student body is female; the same percentage is enrolled part-time. About half the students are enrolled in prebaccalaureate/transfer programs. Approximately ninety percent are white, non-hispanic; about five percent are African-American; and five percent are Hispanic. Although combined enrollment is roughly ten percent lower than it was in 1981, it is almost thirteen percent above the fall 1985 headcount. The college employs a total of twenty-three full-time administrators and 220 full-time faculty. In fiscal year 1991, annual tuition and fee charges were $1,245, placing Black Hawk College on the high end of tuition costs in the state of Illinois.

The nature of the study and purpose of concept mapping were explained during initial planning activities

Staff from the NCRVE project made an initial series of contacts with administrators and faculty from Black Hawk College and conducted a plenary meeting in June of 1992. During these contacts and the meeting, the nature of this study and the purpose of the concept mapping process were explained. Specifically, planning was carried out to accomplish the following:

- Select vocational education stakeholders for participation in this study,
- Develop a focus statement for brainstorming ideas,
- Create a scale for rating ideas,
- Set dates for conducting sessions to brainstorm and structure ideas, and
- Finalize a date for the map interpretation session.

Purpose of this Concept Mapping Project

Determining the basic tenets and key components of vocational education to conceptualize outcomes was the purpose of this study

The purpose of this concept mapping project was to describe basic tenets and key components (i.e., theoretical underpinnings—what people say and/or what people do) of vocational education from the perspective of Black Hawk College faculty, administrators, students, and local business/labor/community constituents. Once these basic tenets and key components of vocational education were identified and their interrelationships and relative importance known, they were visually displayed in map form. The concept map was then systematically used by the participant stakeholders as a common framework to identify potential vocational education outcomes.

Participants

Validity of the brainstormed statements and the capacity of the statements to conceptually represent what vocational education ought to be are fundamental to the concept mapping process. Construct validity was established by the actual participation of stakeholders who

(a) teach vocational education at Black Hawk College,

(b) employ vocational education graduates in their businesses or community agencies,

(c) administer vocational education, and

(d) study vocational education.

Altogether, there were thirty-eight participant stakeholders. Of these, twenty-four were male and ten were female. Thirty-five were white/Caucasian, two were Native American, and one was Hispanic. All the participants were considered to be expert representatives for their particular stakeholder group and experienced in some aspect of vocational education.

Thirteen participants were faculty at Black Hawk College, one was on the faculty at Western Illinois University, a nearby state-funded four-year university, and one was on the faculty at United Township High School. These fifteen participants taught in a wide range of academic and vocational areas. Many of these individuals also had dual or multiple responsibilities other than teaching, such as coordinating various types of partnerships with Black Hawk College, local businesses, and community agencies; designing curriculum and courses relating to vocational education; and advising students.

There were ten administrators. They were employed as deans, vice presidents, managers, coordinators or directors of various academic, technological, or vocational departments/divisions at Black Hawk College. One administrator was employed by Western Illinois University.

Eight participants were from local businesses, labor organizations, or community groups. These individuals represented Quad Cities Electrical, Graphics Communicators International Union, John Deere Harvester Works, Rock Island Arsenal Manufacturing, Private Industry Council, and the Department of Rehabilitation Services.

There were five students. These individuals were currently enrolled in mechanical technology design, small business administration, computer graphics and drafting, or liberal studies at Black Hawk College.

Brainstorming

The focus statement asked participants "What vocational education ought to be"

The focus statement for generating basic ideas regarding the conceptualization of vocational education was "Generate statements (short phrases and/or words) which describe what vocational education ought to be." When the focus statement was used in the concept mapping session, participants were told to think broadly about the concept of vocational education. They were told that this could entail substituting or using collectively such terms as career education, occupational education, or technical education. In addition, probes were used to stimulate the group's thinking once they had begun brainstorming. These probes included

- What works now (in regard to any aspect of your vocational education program)?
- What are the features of your most successful program?
- What represents best practices?
- What will the future require?

The focus statement and probes were intended to elicit thoughts and ideas from Black Hawk College participant stakeholders, who described what vocational education ought to be. During this brainstorming session, over two-hundred and fifty ideas or statements were generated. These were culled, to rid them of redundancy, into ninety-eight statements (Table 1).

Table 1
Brainstormed Statements from Black Hawk College Vocational Education Stakeholders

1. Be hands on/experimental
2. Provide incentives to keep students in school
3. Teach computer/technology literacy
4. Encourage ethical practices/professional ethics/work ethic
5. Foster a real acceptance of vocational education by higher education
6. Supported by the community (financial, input, advisory committees, etc.)
7. Have relevant Illinois college entrance requirements
8. Provide global perspective/economy
9. Have a historical perspective
10. Develop accountability/responsibility for actions on the job
11. Articulated between all levels
12. Provide technical reading/writing skills and teach how to follow oral and written directions
13. Provide leadership development and be a change agent
14. Provide career awareness K-infinity
15. Encourage nontraditional careers
16. Encourage vocational educators to stay current in the field, adapt to change (staff development), and be involved in action research
17. Prepare individuals with specific job/vocational skills
18. Be enjoyable and personally meaningful, interesting, fun
19. Integrate theory and practice

Table 1 (continued)
Brainstormed Statements From Black Hawk College Vocational Education Stakeholders

20. Include reasonable expectations of employment (employability/job oriented)
21. Include cooperation and coordination of secondary education, postsecondary education, business, industry, labor, and the community
22. Be proportional in length to the skills being taught
23. Include basic problem solving
24. Stress team working/building skills
25. Teach job seeking skills
26. Teach students to recognize their skill limits and strengths
27. Stress safety
28. Provide familiarity with all tools and equipment to perform vocational skills, including slang terms (business jargon)
29. Consider environmental awareness
30. Be useful/practical/valuable for students
31. Be competency-based with demonstrated outcomes
32. Be accessible (e.g., distance, time, money, qualifications, age, etc.)
33. Be outcomes based
34. Be a source of pride
35. Increase student self-esteem
36. Develop critical thinking
37. Have curriculum based on work experience
38. Have on-going assessment and revision
39. Integrate vocational and academic content
40. Be adequately funded to ensure quality education
41. Be multidisciplinary
42. Encourage creativity
43. Involve faculty in curriculum development
44. Exemplify instructor cooperation and teamwork
45. Have clear entrance requirements
46. Have clear exit requirements
47. Use total quality management to guide practice
48. Respect/consider ethnic, cultural, and gender differences
49. Teach decision making skills, planning skills, forecasting skills, productive thinking skills
50. Have exemplary facilities for teaching and learning
51. Be accredited between appropriate agencies
52. Involve professional organizations
53. Work with both large and small businesses
54. Have specific teacher training requirements
55. Involve state and federal programming (resources, networking, etc.)
56. Apply research findings from vocational education
57. Reflect institutional goals
58. By physically located with other programs
59. Provide training for a wide range of jobs/careers
60. Teach learning how to learn
61. Match individual interests, aptitudes, and skills with vocations
62. Be relevant to current and future job markets (industry based)
63. Explore/provide career opportunities and hands-on internships
64. Teach organizational (workplace) and job keeping skills
65. Rename vocational education to applied education
66. Provide student and family support services (e.g., counseling, advising)
67. Be taught by an integrated team (system)
68. Be pre-professional/technical level (not postgraduate)
69. Include job shadowing, placement, and follow-up
70. Provide continual training for employees supported by employers
71. Include health and wellness

Table 1 (continued)
Brainstormed Statements From Black Hawk College Vocational Education Stakeholders

72. Include people of all ages curriculum design
73. Include basic skills (e.g., reading, writing, math, science)
74. Prepare students for job requirements/be relevant and responsive to meeting industry needs
75. Teach interpersonal and communication skills
76. Encourage continuing or lifelong learning
77. Have active advisory committees involving industry and educators
78. Have state of the art equipment
79. Overcome negative attitude of vocational training by community, business, and higher education
80. Offer internship programs/on the job training
81. Employ quality/enthusiastic instructors who have practical experience
82. Use a variety of teaching styles
83. Help older or new students to adjust to school or job environments
84. Provide for life experience proficiency/credit
85. Be clearly defined, career (path) oriented
86. Offer comprehensive curriculum
87. Cover a variety of service areas (different fields)
88. Offer classes at variable times (flexibility scheduling)
89. Keep up to date with industry/technological changes
90. Provide more training in primary and secondary programs
91. Interact directly with business/industry (e.g., planned business tours)
92. Match training with local job market
93. Provide more self-employment training
94. Require appropriate prerequisite courses
95. Ensure that students have access to funding/financial aid
96. Have less administrative interference and more decisions by professors and students
97. Offer students a course on services for people with disabilities
98. Be realistic

A broad range of statements was generated by brainstorming

Reflecting the diversity of the participants, a broad range of statements was generated. For example, some statements related to curriculum and foundational skills:

- be outcomes based
- be hands on/experiential
- be multidisciplinary
- teach computer/technology literacy
- teach basic problem solving
- teach job seeking skills

Some statements related to the overall ethos of vocational education and what it means for its students:

- be a source of pride
- increase student self esteem
- be accessible (i.e., consider distance, time, costs, disabilities)

Other statements related to teaching methodology and the credibility of vocational education:

- be taught by an integrated team (system)
- use a variety of teaching styles
- be supported by the community (i.e., input, advisory, financial)
- be accredited by appropriate agencies

Still other statements related to funding and accountability:

- be adequately funded to ensure quality education
- have specific teacher training requirements
- encourage vocational educators to stay current in the field

The list of ninety-eight statements represents the thinking of the participant stakeholders. Their statements specifically described what they believed vocational education ought to be.

Rating of Statements

A Likert-type rating scale was used to provide a sense of relative importance for the brainstormed statements

In order to obtain a sense of the relative importance or priority of the brainstormed statements, each participant was asked to rate each statement on a Likert-type priority scale. The rating instructions were rate each statement on a 1 to 5 priority scale where

1 = very low priority
2 = low priority
3 = moderate priority
4 = high priority
5 = very high priority

The ratings were then aggregated and averaged. This rating activity was completed by participants relatively quickly, in approximately fifteen minutes, on average.

Sorting

Cards were grouped and labeled in ways that made sense to each participant

The card sorting activity was conducted to obtain each individual's thinking on the conceptual structure (i.e., how the brainstormed statements were organized and interrelated) of all ninety-eight statements. Each participant was given a deck of cards; each card listing one of the ninety-eight statements. The participants were then instructed to group the statements into piles of similar statements in a way that made sense to them. More time was required for this activity, ranging from one to one and one-half hours for each participant.

Computation of Maps

The sort data were entered into Trochim's computer program *The Concept System* (1989b) and were subjected to multidimensional scaling (MDS) and then hierarchical cluster analysis. The results of the multidimensional scaling analysis were used to make a number point map representing all ninety-eight brainstormed statements relationally as points on a two-dimensional plot (Figure 1).

Figure 1. Number Point Map for Vocational Education at Black Hawk College

Statements were plotted on the map according to their proximal similarity to other statements

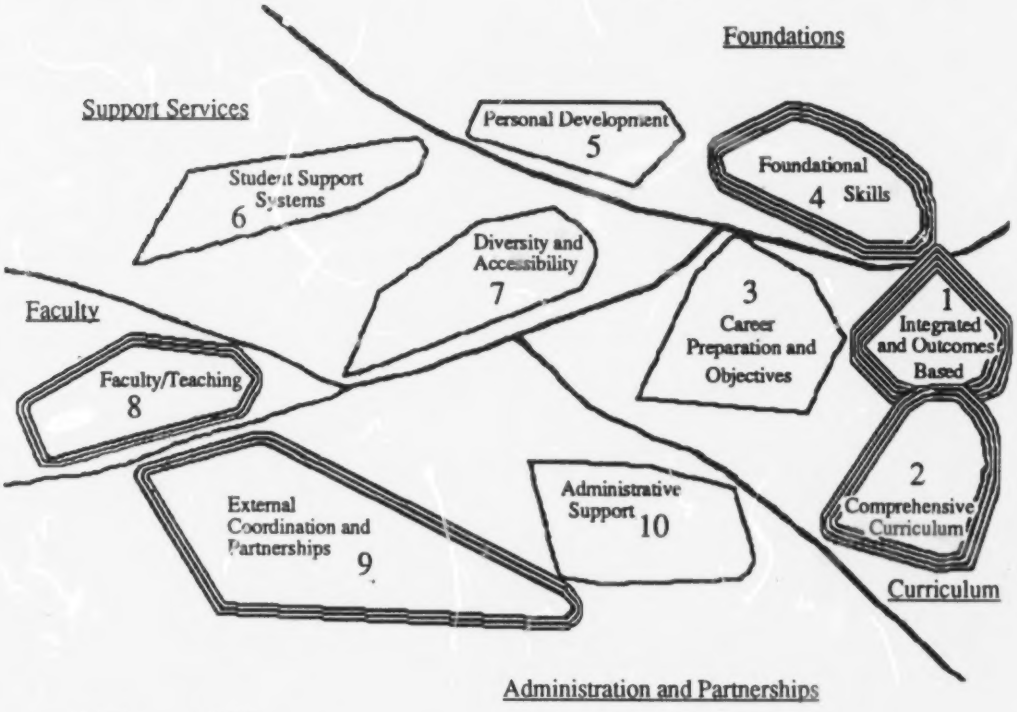
Each statement, designated by numeric characters that act as identification numbers, was plotted on the map according to its proximal similarity to other statements. Statements that were sorted together frequently are closer to each other on the map than statements that were not sorted together frequently. For example, in Figure 1, statements 60, 36, 49, 23, and 24 are closely grouped together and located in the north east side of the map. These statements were thought to be similar by the participants and, thus, were frequently sorted together.

The cluster analysis was superimposed on the MDS results. Decisions about the number of clusters were based on statistical criteria and on ease of interpretation (i.e., understanding the meaning of the statements located within the cluster). Participants in the Black Hawk College grouped the brainstormed statements into ten clusters (Table 2).

Interpretation of Maps

The concept map resulting from the MDS and cluster analyses of the sort data is fully displayed in Figure 2.

Figure 2. Cluster Priority Rating Map of Vocational Education at Black Hawk College



Level	Value
1	2.08 to 2.58
2	2.58 to 3.08
3	3.08 to 3.58
4	3.58 to 4.07
5	4.07 to 4.57

Table 2
Brainstormed Statements and Priority Ratings Grouped by Cluster for Black Hawk College

Cluster 1 - Integrated and Outcomes Based

1. Be hands on/experiential (4.57)
17. Prepare individuals with specific job/vocational skills (4.39)
19. Integrate theory and practice (4.44)
31. Be competency-based with demonstrated outcomes (4.31)
22. Be proportional in length to the skills being taught (3.44)
45. Have clear entrance requirements (3.44)
39. Integrate academic and vocational content (4.17)
94. Require appropriate prerequisite courses (3.33)
33. Be outcomes based (4.00)
46. Have clear exit requirements (3.81)

Cluster Average = 3.99

Cluster 2 - Comprehensive Curriculum

37. Have curriculum based on work experience (4.06)
86. Offer comprehensive curriculum (3.47)
41. Be multidisciplinary (3.36)
80. Offer internship programs/on the job training (4.11)
87. Cover a variety of service areas (different fields) (3.28)
38. Have on-going assessment and revision (3.94)
62. Be relevant to current and future job markets (industry based) (4.33)
57. Reflect institutional goals (2.94)
92. Match training with local job market (3.75)

Cluster Average = 3.69

Cluster 3 - Career Preparation and Objectives

8. Provide global perspective/economy (2.69)
9. Have a historical perspective (2.08)
74. Prepare students for job requirements/be relevant and responsive to meeting industry needs (4.42)
93. Provide more self-employment training (2.78)
30. Be useful/practical/valuable for students (4.00)
63. Explore/provide career opportunities and hands-on internships (4.08)
20. Include reasonable expectations of employment (employability/job oriented) (4.11)
59. Provide training for a wide range of jobs/careers (3.33)
98. Be realistic (3.39)
68. Be pre-professional/technical level (not postgraduate) (2.08)
85. Be clearly defined, career (path) oriented (3.64)
47. Use Total Quality Management to guide practice (3.08)
84. Provide for life experience proficiency/credit (3.17)

Cluster Average = 3.30

Note: Priority ratings are averaged for each statement and presented in parentheses. Each statement was rated on a 1 to 5 scale where: 1 = very low priority, 2 = low priority, 3 = moderate priority, 4 = high priority, and 5 = very high priority. Cluster averages reflect the mean for all statements grouped within each of the clusters.

Cluster 4 - Foundational Skills

3. Teach computer/technology literacy (4.17)
27. Stress safety (3.25)
12. Provide technical reading/writing skills and teach how to follow oral and written directions (4.28)
64. Teach organizational (workplace) and job keeping skills (3.50)
28. Provide familiarity with all tools and equipment to perform vocational skills, including slang terms (business jargon) (3.53)
29. Consider environmental awareness (2.89)
4. Encourage ethical practices/professional ethics/work ethic (3.69)
36. Develop critical thinking (3.92)
60. Teach learning how to learn (3.64)
23. Include basic problem solving (4.00)
49. Teach decision making skills, planning skills, forecasting skills, productive thinking skills (4.28)
73. Include basic skills (e.g., reading, writing, math, science) (4.08)
24. Stress team working/building skills (3.86)
75. Teach interpersonal and communication skills (3.83)

Cluster average = 3.78

Cluster 5 - Personal Development

10. Develop accountability/responsibility for actions on the job (3.78)
13. Provide leadership development and be a change agent (3.14)
26. Teach students to recognize their skill limits and strengths (3.25)
25. Teach job seeking skills (3.03)
42. Encourage creativity (3.39)
71. Include health and wellness (2.58)
76. Encourage continuing or lifelong learning (3.72)

Cluster average = 3.27

Cluster 6 - Student Support Systems

2. Provide incentives to keep students in school (2.49)
14. Provide career awareness K-infinity (3.19)
95. Ensure that students have access to funding/financial aid (3.58)
34. Be a source of pride (3.78)
35. Increase student self esteem (3.5)
61. Match individual interests, aptitudes, and skills with vocations (3.64)
66. Provide student and family support services (e.g., counseling, advising) (2.69)
83. Help older or new students to adjust to school or job environment (3.06)

Cluster average = 3.24

Cluster 7 - Diversity and Accessibility

15. Encourage non-traditional careers (2.97)
32. Be accessible (e.g., distance, time, money, qualifications, age, etc.) (3.94)
88. Offer classes at variable times (flexibility, scheduling) (3.53)
18. Be enjoyable and personally meaningful, interesting, fun (3.86)
69. Include job shadowing, placement, and follow-up (3.25)
48. Respect/consider ethnic, cultural, and gender differences (3.58)
97. Offer students a course on services for people with disabilities (2.40)

Cluster Average = 3.37

Cluster 8 - Faculty/Teaching

16. Encourage vocational educators to stay current in the field, adapt to change (staff development), and be involved in action research (4.47)
54. Have specific teacher training requirements (3.33) -
81. Employ quality/enthusiastic instructors who have practical experience (4.42)
44. Exemplify instructor cooperation and teamwork (3.42)
67. Be taught by an integrated team (system) (2.94)
82. Use a variety of teaching styles (3.72)
90. Provide more training in primary and secondary programs (3.03)

Cluster Average = 3.62

Cluster 9 - External Coordination and Partnerships

5. Foster a real acceptance of vocational education by higher education (3.53)
50. Have exemplary facilities for teaching and learning (3.86)
65. Rename vocational education to applied education (2.17)
6. Supported by the community (financial, input, advisory committees, etc.) (4.17)
55. Involve state and federal programming (resources, networking, etc.) (3.08)
40. Be adequately funded to ensure quality education (4.42)
70. Provide continual training for employees supported by employers (3.75)
79. Overcome negative attitude of vocational training by community, business (3.44)
21. Include cooperation and coordination of secondary education, postsecondary education, business, industry, labor, and the community (4.17)
52. Involve professional organizations (3.69)
77. Have active advisory committees involving industry and educators (3.[illegible]2)
53. Work with both large and small businesses (3.67)
91. Interact directly with business/industry (e.g., planned business tours) (3.64)

Cluster Average = 3.65

Cluster 10 - Administrative Support

7. Have relevant Illinois college entrance requirements (2.97)
96. Have less administrative interference and more decisions by professors and students (2.78)
43. Involve faculty in curriculum development (4.11)
51. Be accredited between appropriate agen (3.94)
11. Articulated between all levels (3.56)
58. By physically located with other programs (2.31)
56. Apply research findings from vocational education (3.22)
72. Include people of all ages in curriculum design (2.47)
89. Keep up to date with industry/technological changes (4.53)
78. Have state of the art equipment (3.83)

Cluster Average = 3.37

During the three-hour interpretation session, participant stakeholders examined the statements in each cluster for mutual understanding and consensually named each of the ten clusters. The participants then examined the named clusters and, aided by the statistical analysis produced by *The Concept System*, further grouped these clusters into five regions: foundations, curriculum, administration and partnerships, faculty, and support services (Table 3).

Table 3
Listing of regions and clusters for Black Hawk College

Region	Clusters
I: Curriculum	1. Integrated and outcome based 2. Comprehensive curriculum 3. Career preparation and objectives
II: Foundations	4. Foundational skills 5. Personal development
III. Support Services	6. Student support systems 7. Diversity and accessibility
IV: Faculty	8. Faculty/teaching
V: Administration and Partnerships	9. External coordination and partnerships 10. Administrative support

These five regions and their associated ten clusters are easily discerned in Figure 2, previously displayed. Beginning in the east and moving counter clockwise, three clusters—named integrated and outcomes based, comprehensive curriculum, and career preparation and objectives—contain statements that describe the curriculum region.

Two clusters, located in the northeast named personal development and foundational skills, contain the tenets of vocational education that describe the foundations region.

The third region, support services, lies in the northwest. This region contains two clusters: student support systems and diversity and accessibility. These clusters contain descriptions of various types of student support systems and descriptions of what ought to be in terms of (1) understanding the diverse cultural differences of vocational education students and (2) making vocational education accessible to all potential vocational education students.

The broad area on the south side of the map contains two clusters, external coordination and partnerships and administrative support. These clusters describe the administration and partnerships region.

The west side of the map, with a single cluster, pertains to faculty and teaching. This cluster, representing the faculty region, pertains to the quality of faculty and the effectiveness of the faculty in reaching the vocational education needs of their students.

The cluster rating map shows relationships within vocational education and tenets that describe its key components

In its entirety, the cluster rating map of vocational education demonstrates the various relationships within vocational education at Black Hawk College and simultaneously shows individual elements or basic tenets of what ought to be in vocational education. The map also displays clusters of elements or tenets that describe key components of vocational education. It also displays regions of clusters or key junctional areas of vocational education.

Figures 1 and 2 reveal three levels of information that describe what vocational education ought to be, as perceived by the participant stakeholders. The lowest level reveals the basic tenets of vocational education by the points representing the various brainstorm statements (Figure 1). The next level reveals key components of vocational education through the ten clusters (Figure 2) and the highest level reveals the broader context of vocational education via the regions (Figure 2).

Figure 2 also depicts these levels of information in relation to each other and the whole, and it reveals the relative priority of vocational education tenets by cluster and by region. The height of the cluster boundary (i.e., fence) indicates the relative priority rating for each cluster. The higher the fence bordering each cluster, the higher the average rating for all the statements within that cluster; the lower the fence, the lower the average rating.

As is clearly shown by the height of the fences in Figure 2, the integrated and outcomes-based cluster has the highest relative priority rating, with a priority rating between 4.07 and 4.57 on the 5.0 scale. The next highest priority rating comes from two of its neighboring clusters, foundational skills and comprehensive curriculum. These clusters were rated between 3.58 and 4.07. The external coordination and partnerships cluster and the faculty/teaching cluster were next in priority; they were rated 3.08 to 3.58.

The remaining five clusters—student support services, diversity and accessibility, personal development, administrative support, and career preparation and objectives—had the lowest relative priority ratings. They were rated 2.08 to 2.58 in level of priority. See Table 2 for the actual average priority rating values for each statement and for each cluster.

Vocational Education Outcomes

Outcomes were articulated using the map as a framework to guide participants

After reaching mutual understanding and consensus on the meaning of the cluster rating map of vocational education, the participant stakeholders of Black Hawk College were asked to articulate outcomes of vocational education using the map as a framework to guide them. Participant stakeholders were asked to state what the vocational education outcomes would be for each of five identified

regions if the tenets, as described in the clusters in each of the five regions, were carried through. The specific directions provided by the facilitator encouraged participants to think in terms of changes (e.g., increases or decreases) that could provide a basis for building measurements. Outcomes articulated by the participants are revealed in Table 4.

Table 4
Vocational Education Outcomes for Each Region on the Cluster Rating Map for Black Hawk College

REGION #1 CURRICULUM—Encompasses the following clusters: (1) Integrated and Outcomes Based, (2) Comprehensive Curriculum, and (3) Career Preparation and Objectives.

1. Increase in number of employable and productive individuals.
2. Increase integration of vocational/academic skills and programs.
3. Increase length of employment.
4. Decrease in customer complaints (complaints of business/industry about graduates).
5. Decrease in educational barriers.
6. Increase student enrollment/retention.
7. Increase student involvement.
8. Increase in internship/on-the-job opportunities.
9. Increase in usefulness, practicalness and relevance of courses.
10. Increase in understanding of exit requirements.
11. Increase in use of outcomes based education.
12. Increase in involvement of business and industry, students, and other stakeholders in curriculum development.

REGION #2 FOUNDATIONS—Encompasses the following clusters: (4) Foundation Skills and (5) Personal Development.

1. Increase in number of students mastering basic skills (reading, writing, math, computer skills).
2. Increase self-esteem.
3. Increase creativity.
4. Decrease worker absenteeism.
5. Increase worker flexibility within job.
6. Increase demand for further training.
7. Increase ability to change job.
8. Decrease in job stress.
9. Increase in teamwork skills.
10. Increase interpersonal/communications skills.
11. Decrease in job accidents.
12. Decrease in unethical behavior.
13. Increase in higher-order cognitive skills.
14. Decrease in labor cost/increase in efficiency.
15. Increase in technological literacy.
16. Decrease in medical/insurance/worker compensation claims.
17. Decrease in needed on-the-job during initial employment.

REGION #3 SUPPORT SERVICES—Encompasses the following clusters: (6) Student Support Systems and (7) Diversity and Accessibility.

1. Increase program completion rates.
2. Improve student self-image.
3. Increase morale.

4. Improve student/career program match.
5. Reduce the "glass ceiling."
6. Increase in financial aid to students.
7. Increase in student support services (whatever they need).
8. Increase student enrollment.
9. Increase in services/accessibility for "other"-abled students.
10. Increase employment for "other"-abled students.
11. Increase in quality of product.
12. Increase of individuals with disabilities in workforce.
13. Increase in non-traditional students served.
14. Increase in learning.
15. Increase in career exploration.
16. Increase in open entry/exit and flexible scheduling.

REGION #4 FACULTY—Encompasses the Faculty/Teaching cluster (8).

1. Increase teacher satisfaction.
2. Increase teacher pay.
3. Increase match of teaching styles with learning styles.
4. Increase teacher enthusiasm.
5. Increase teachers seeking continuing education/faculty development.
6. Increase instructors' field experience.
7. Increase teacher retention.
8. Improve teacher training requirements.
9. Increase research activity.
10. Decrease student frustration.
11. Increase teacher/student interaction.
12. Improve classroom learning environment.
13. Decrease teacher loneliness.
14. Decrease student alienation.
15. Decrease teacher alienation.
16. Increase of utilization of research findings.
17. Improve evaluation/assessment of teaching/learning process.
18. Increase in useful research.
19. Increase in ability to make learning fun.

REGION #5 ADMINISTRATION AND PARTNERSHIPS– Encompasses the following clusters: (9) External Coordination and Partnerships and (10) Administrative Support

1. Increase funding to ensure quality education.
2. Increase cooperation between schools and business.
3. Increase continuity.
4. Increase employer involvement in program design.
5. Improve image/acceptance of vocational education.
6. Improve design of programs to be articulated between school and work.
7. Increase in current technology.
8. Decrease in administrative barriers.
9. Improve articulation from kindergarten through work.
10. Increase positive attitude of business and students.
11. Increase money spent on computers and technology.
12. Clearer focus on educational priorities through enhanced partnerships.
13. Improve facilities, equipment, and resources.
14. Improve college entrance requirements that foster career education.

As espoused by the vocational education participant stakeholders, these broadly-based outcomes, by inference, are linked directly to specific regions of the map (Figure 2). Thus, they are also linked to specific named clusters and to specific tenets of vocational education located within the clusters. These identified outcomes can now provide a clear basis for

1) setting goals and objectives,

2) determining ways to measure program and student success,

3) improving vocational education programs, and

4) improving institutional effectiveness by understanding vocational education and its intended outcomes.

Conclusion

Maps can define outcomes and facilitate making informed decisions for vocational education evaluation

The purpose of this concept mapping project was to identify the basic tenets and key components of vocational education in order to determine vocational education outcomes. The maps implicitly or explicitly describe what vocational education experts believe in, what they practice. The maps clearly define what vocational education ought to be and were easily employed to identify outcomes. The maps and accompanying information can be used for other purposes. They can facilitate policy makers and program planners and managers in making informed decisions in regard to setting policy and to planning, implementing, and evaluating vocational education.

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Chapter 6

Outcomes Assessment in Vocational Education

N. L. McCaslin

Overview

Federal and state governments, businesses, and the public are calling for increased accountability at all levels of education. In vocational education, this accountability can be reflected in the assessment of educational, economic, and psycho-social outcomes. This chapter presents a framework and foundation for the selection of outcomes; the identification of indicators; and the procedures for collecting, analyzing, and reporting of information. Combined with the concept mapping process described in Chapter 5 which can be used to identify outcomes, this information provides a basis for selection of performance assessment techniques described in Chapter 7.

In this chapter

This chapter presents a discussion of the following topics:

Topic	See Page
Relationship of Outcomes Assessment to Other Types of Evaluation	96
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Vocational Education Outcomes	97
Types of Vocational Education Outcomes	98
Assessing Vocational Education Outcomes	102

Relationship of Outcomes Assessment to Other Types of Evaluation

Results of student achievement are the focus of reform, but outcomes assessment can fit into a more comprehensive evaluation framework

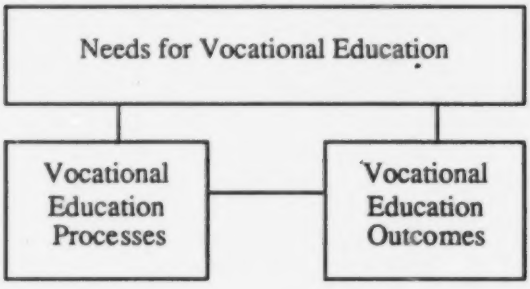
Much of the current literature on educational reform could lead one to conclude that the only important evaluation information is that related to assessing results in terms of student achievement. However, if student achievement information is all that is available, how can teachers and administrators know what worked and did not work? Upon what basis should decisions to add and drop programs be made? What should be changed in order for vocational students to achieve at higher levels?

Those concerned with evaluating the outcomes of vocational education should consider how outcomes assessment fits into a broader and more comprehensive approach to evaluation. This approach requires the use of valid and reliable information of three major types:

- the needs for vocational education as expressed by clients (i.e., students, employers, and society),
- the educational processes followed by vocational education programs, and
- the outcomes achieved by students in vocational education programs.

A more detailed explanation of these types is presented in *A Framework for Evaluating Vocational Education* (McCaslin, 1990). The interrelationships of these three types of evaluation information are presented in Figure 1.

Figure 1. Interrelationships of evaluation information



Vocational Education Needs

Vocational education is customer-driven and broadly defined to include all groups in the community

Individuals choose to participate in postsecondary vocational education on a voluntary basis. Individuals generally will not enroll unless they see the opportunity to benefit from participation in the program. Therefore, vocational education can be viewed as a "customer" driven program. "Customers" in this case are broadly defined to include all groups in a community that might have a stake in vocational education (Rossi & Freeman, 1991).

Kaufman and Stone (1983) indicated that in assessing needs it is necessary to show and document gaps between current results and desired results (in terms of outcomes) and to then place these gaps or needs in priority order. Accordingly, needs are concerned with determining the extent or magnitude of a problem. Needs can be determined by reviewing existing information or collecting new information. This information might be of either a quantitative or qualitative nature. Needs provide the basis for development and implementation of educational processes.

Vocational Education Processes

Evaluation of vocational education processes provides valuable information

Process information provides evaluators with a basis for understanding and interpreting what has occurred. Process includes information such as program goals and objectives, length of course, linkages with business and industry, use of advisory councils, type and kind of job placement services provided, and safety. Many states' five-year reviews of their vocational education programs have relied on this type of information for program approval. Program sponsors/funders typically place heavy emphasis on process information in demonstrating the accountability of their programs.

If vocational education programs are to be improved as a result of an evaluation, it is essential to provide information about how they have been conducted. Rossi and Freeman (1991) have referred to the evaluation of processes as systematic monitoring to examine program coverage and delivery. Of course, conclusions that can be drawn about the effectiveness of processes are often based on the outcomes that are produced by them.

Vocational Education Outcomes

The current emphasis in educational evaluation is on documenting educational effectiveness in terms of student achievement. This type of effectiveness has been referred to as outcomes, impact

Outcomes, impact, or product evaluation document educational effectiveness

(Rossi & Freeman, 1989), or product (Stufflebeam & Shinkfield, 1985) evaluation. For the purposes of this chapter, the term outcomes evaluation will be used.

Outcomes in postsecondary vocational education refer to the results or accomplishments of those who participate in these programs (McCaslin, 1990). These outcomes should be easily understood and agreed upon by vocational education stakeholders. Among the questions that outcomes evaluation can answer are the following:

- What results were obtained?
- How well were needs reduced?
- What should be done with the program after it has run its course?

Single or composite outcome measures should be used

An outcome might consist of either a single statistic or a composite measure based on several factors. The terms core standards, measures of performance, and performance standards are sometimes used in reference to educational outcomes (e.g., the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 and the Job Training Partnership Act).

Types of Vocational Education Outcomes

A wider range of outcomes for vocational education are currently purported

The outcomes of vocational education often have been thought of solely in economic terms. However, more recent discussions and studies have included a wider range of educational, psychological, and sociological outcomes. In this chapter, three major types of outcomes are described: economic, educational, and psycho-social.

Economic Outcomes

Economic outcomes are usually measured in terms of the experiences former vocational education students have in the labor market. Examples of economic outcomes include the following:

Examples of Economic Outcomes

- Labor force participation rates
- Employment and unemployment rates
- Training-related placement
- Type of employment
- Earnings
- Employee satisfaction with work
- Employer satisfaction with employees

Labor force participation rates refer to the extent to which individuals are actually working or seeking work. It does not include those individuals who have given up and stopped seeking work even though they are unemployed.

The outcomes of **employment and unemployment rates** are determined by the percentage of individuals who are either working or not working. This outcome as well as the previous one (labor force participation rates) can be compared with state and national statistics for similar groups of individuals if the same definitions have been used in computing the rates.

Historically, **training-related placement** has been the major outcome for evaluating vocational education. This outcome refers to the percent of individuals who find employment in the occupations for which they were trained. This outcome has been criticized since its achievement can be determined by factors that are beyond the control of vocational educators.

The **type of employment** has also become an important outcome as emphasis on vocational education's role in economic development has increased. Since many new jobs are in small businesses, self-employment has become an important outcome for vocational education and many entrepreneurship programs have been developed with this specific outcome in mind. The percentage of males and females distributed across all types of occupations is another important factor and many programs have been specifically designed to address inequities in these occupational areas.

Earnings represent another type of outcome for vocational education programs. In determining earnings, it is usually helpful to think in terms of annual earnings that reflect both hourly wages and number of hours worked. Annual earnings also allow

evaluators to compare the wages of those who work as an employee with those who are self-employed. Also, it is important to examine and compare the earnings of those who are employed in the occupations for which they were trained with those who are not working in those occupations.

The degree of **employee satisfaction** with work is classified here as an economic outcome since it is often reflected in the productivity of an individual. Although employee satisfaction is influenced by many factors beyond the influence of vocational education, it can be used to examine how the student's program developed a realistic picture of the work place.

Similarly, **employer satisfaction** with employees is classified as an economic outcome since it can be a reflection of a businesses' success in the marketplace. This outcome also can be influenced by many factors beyond employer satisfaction with individual employees. Therefore, evaluators need to be cautious in interpreting the results.

Educational Outcomes

A move toward instructional outcomes is advocated by legislators and policymakers

Legislators and policymakers are moving more and more toward accountability measures tied to the instructional outcomes of educational agencies. This reflects a departure from the institutional or process outcomes used in the past. This growing concern for educational outcomes is being reflected in revisions to state-wide approaches to vocational education evaluation in states such as Illinois, Minnesota, and Virginia. Possible educational outcomes follow:

Examples of Educational Outcomes

- Basic educational skills
- Higher-order thinking skills
- Knowledge of the world of work
- Occupational skills
- Attendance and dropout rates
- Continuing education rates
- Students satisfaction with education

The **development of basic educational skills** through courses in mathematics and English are perceived by more than eighty-six percent of the American public as important for all students (Elam, 1980). The high level of importance placed on these subjects indicate that vocational educators should emphasize the development of these skills in their courses by showing students how they can be applied.

Higher-order thinking skills require students to do more than simply recall or understand information. The development of these higher-order thinking skills require students to apply, analyze, synthesize, and/or evaluate information (Bloom, 1956). If students are to develop these types of skills, the objectives, instructional activities, and evaluation processes need to reflect this emphasis.

Another educational outcome is **knowledge of the world of work.** If, as Cetron and Davies (1989) predict for the next decade, new jobs will appear and obsolete jobs will be gone faster than ever before—individuals will need to know the type of jobs that will be available to them as the work force changes.

Occupational skills have been the major outcome of interest to many postsecondary vocational educators. Much of the evidence for this outcome has been provided through the use of competency and/or performance testing.

The levels of **school attendance and dropout rates** are particularly important outcomes. If our country is to increase the educational level of students, it is imperative that attendance rates be increased and dropout rates be decreased. These rates should be examined for differences among races, given the wide disparity in the rates for these groups.

The **continuing education rate** for students represents an outcome for vocational education measured only recently. Laughlin (1986), in a national longitudinal study of more than 6000 individuals, reported that sixty-two percent of vocational education students initially enrolled in some type of postsecondary education and training. Of those who enrolled, sixty-two percent completed or were still enrolled at the time of the follow-up.

Psycho-Social Outcomes

Psycho-social outcomes relate to the personal development of students

The psycho-social outcomes of vocational education relate primarily to the personal development of the student. These outcomes are often associated with participation in vocational student organizations. Some of these outcomes are difficult to measure and indicators of their effectiveness are not readily available. A few of these outcomes follow:

Examples of Psycho-Social Outcomes

- Aspirations
- Attitudes and values
- Self-esteem
- Citizenship
- Leadership

The **aspirations** of students refer to their desires and ambitions. Experiential learning provided by vocational education provides students with real-life examples to use in planning their future. In many cases personal contacts with individuals in the workplace can provide the opportunity for students to identify role models that they wish to emulate.

Employers often criticize the **attitudes and values** that individuals bring to the work place. Teachers and administrators have the opportunity to influence students' attitudes and values by the personal examples they give to students. This outcome can also be influenced through the participation of a student in a work-based learning program.

Self-esteem refers to the belief students have in themselves. It also refers to their self respect. This outcome can be influenced by how other individuals and faculty interact with students. Positive learning environments need to be established by teachers, administrators, job supervisors, and other students and co-workers.

The outcome of **citizenship** refers to how students demonstrate their membership in society by acts such as voting and participating in community organizations.

Leadership skills will be needed throughout a student's life. These skills can be developed by providing students with opportunities to direct and guide their own learning experiences in vocational education.

Assessing Vocational Education Outcomes

Assessing outcomes of vocational education, like any other evaluation, requires a carefully thought out plan. A worksheet (see Figure 2) for planning outcome assessments can be used to assist

Outcomes assessment requires careful planning

with these efforts. Five steps need to be taken in completing the worksheet:

1. Select outcomes to be assessed,
2. Identify indicators for each outcome,
3. Identify information collection arrangements,
4. Determine the analysis procedures, and
5. Report the information.

Select Outcomes To Be Assessed

To begin the process, select outcomes

The first step in completing the worksheet is to select the outcomes that are to be assessed. The economic, educational, and psychosocial outcomes discussed earlier in this chapter provide an initial listing for most postsecondary vocational education programs.

The Carl D. Perkins Vocational Applied Technology Education Act of 1990 requires all vocational education programs to evaluate their programs using the following outcomes:

1. measures of learning and competency gains, including student progress in the achievement of basic and more advanced academic skills and
2. one or more measures of performance, which shall include only
    - competency attainment;
    - job or work skill attainment or enhancement, including student progress in achieving occupational skills necessary to obtain employment in the field for which the student has been prepared, skills which include occupational skills of the industry the student is preparing to enter
    - retention in school or completion of secondary school or its equivalent; and
    - placement into additional training or education, military service, or employment (American Vocational Association (AVA), 1990, p. 70).

Often state educational agencies have additional outcomes for which they want evaluation information. Local postsecondary agencies may also require information regarding even other specific outcomes. All of these factors need to be considered when

Figure 2. A worksheet for planning outcomes assessment

Outcomes	Indicator(s)	Information Collection Arrangements			Analysis Procedures	Reporting of Information		
		By Whom?	Conditions?	When?		To Whom?	How?	When?

selecting the outcomes to be assessed. The outcomes selected for assessment should be listed in the first column of the worksheet.

Identify Indicators for Each Outcome

The second step is to identify indicators

Second, potential indicators need to be identified for each outcome that will be assessed (Oakes, 1986). These indicators can be quantitative or qualitative in nature. Many vocational programs have well-established performance testing programs to determine the occupational skill of their students. For example, the National Occupational Competency Tests could be used as an indicator. Other programs may wish to select academic skills as an outcome of interest and use tests to determine the mathematics, reading, or writing ability of their students. When relevant indicators are available, the assessment process is simplified greatly.

In other cases, new sources of data and information will need to be developed as indicators. The emphasis on articulation has resulted in many programs where students can get advanced standing in four-year colleges and universities (e.g., 2+2+2). In this case a postsecondary institution might have selected the continuing education rate of its students as an outcome to be assessed. Since it is a new area, information regarding this outcome may not be available and a new effort may be needed to gather this information.

Identify Information Collection Arrangements

The third step is to designate data collection arrangements

The third step in assessing outcomes is to designate the arrangements for collecting the information needed. Details are needed such as

- Who will collect the data or information?
- What conditions will be needed to collect data?
- When will data collection need to be completed?

These questions are of paramount importance since most postsecondary institutions will want to assess their outcomes as objectively as possible.

Identifying the person who will collect the information is an important decision to be made in planning how to assess outcomes. If the outcomes are being assessed to provide summative information for accountability purposes, it would be advisable to select an individual who is external to the postsecondary institution and who would be viewed as more objective and credible. On the other hand, if the outcomes are being assessed primarily to provide formative information for program improvement then a person internal to the postsecondary institution

might be identified because of his or her competence in evaluation and knowledge of the existing programs.

Another important task in identifying conditions for collecting information is to specify how the information will be collected. This specification should answer questions such as

- If existing information is to be used, will permission of students be required to obtain this information?
- If information is to be compared longitudinally, how will this information be retained?
- Will a sample or a population of students be used to collect the information?
- Will information be collected directly from the students or will teachers, administrators, or counselors be used to collect the information?

In completing the section of the worksheet, it is imperative to indicate when information will be collected. Often the time is determined by an outside agency. For example, the state department of education or board of regents may require certain types of outcome information by a specified date in order for a postsecondary institution to receive funding. Also, time frames could be specified by the requirements of management information systems or other accountability mechanisms established by the postsecondary institution.

Determine the Analysis Procedures

The fourth step requires determining analysis procedures

The fourth step in completing the worksheet is to determine the analysis procedures. The major purpose of the data analysis process is to reduce and synthesize the information into a more manageable and informative set of data. In assessing outcomes, two basic types of indicators were specified earlier—quantitative or qualitative.

Much of the analysis required for assessing outcomes that use quantitative data can be analyzed using descriptive statistics. Qualitative data, on the other hand, can be analyzed using content analysis, key incidents, analysis in the field, and searching for patterns and categories. Both of these types of analysis require careful and systematic study and interpretation.

Report the Information

The last step is to report results to stakeholders

The final step in completing the worksheet is to decide how the information will be reported. The key questions to be addressed include:

- To whom is the report intended?
- How will the information be reported?
- When will the report be available?

Each of these questions will be described briefly in this section.

Identification of the intended audiences for information regarding the outcomes of a postsecondary vocational education program is an essential ingredient in the assessment process. One of the most important audiences is local program stakeholders. These stakeholders include faculty, administrators, counselors, employers, and students. These are the people most directly affected by a program and the ones who need information to use in improving them.

Another important audience is the State Department of Education or the Board of Regents. These agencies often provide funding and are looking for information regarding the effects of this funding.

The U. S. Department of Education is another an audience for the report. Within the Department of Education, the Office of Vocational and Adult Education has primary responsibility for administering the federal vocational education legislation. As mentioned earlier, the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 specifies the need for information regarding the effectiveness of vocational education.

Findings should be presented in a timely manner to have the maximum impact on postsecondary vocational education

Specification of how the information will be reported is yet another important task. One of the most common formats is a printed report. However, there are numerous other ways to report evaluative information such as oral reports, video-tapes, and multimedia presentations. Still other formats include fact sheets with questions and answers, executive summaries, public testimony, and debates. No matter what format is selected it is important to keep the message simple, straight forward and easy to understand.

Finally, it is important to indicate when the report will be available. To make the assessment of outcomes most valuable, results must be presented in a timely manner for relevant discussions and decisions. In some instances timeliness for submitting reports are specified by sponsors well in advance. Each individual responsible for assessing outcomes needs to time the release of reports to have the maximum impact on improving programs that are offered by postsecondary institutions.

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Chapter 7

Performance Assessment

Linda Mabry

Background

Problems associated with standardized educational testing have become increasingly well-documented (see Berlak, 1992a; Cannell, 1987; Cooley & Bernauer, 1991; Haladyna, Nolen, & Haas, 1991; Linn, 1991; Massey, 1989; Smith & Rottenberg, 1991; Wilson & Corbett, 1989). At the same time, interest in performance assessment as an alternative means of representing and assessing learners' competence has grown. Performance assessment is now being explored across the country at every educational level—elementary, secondary, and postsecondary.

Vocational educators have long used performance assessment to evaluate student learning (Finch & Crunkilton, 1984; Wentling, 1980). Today, they are reexamining traditional notions of performance assessment, seeking to expand and improve their use of these methodologies. While experience with performance assessment is relatively great in the field of vocational education, the need for these evaluation techniques may be relatively great, as well. There is opportunity for reciprocation: The field can learn from and build upon vocational education's experience with performance assessment while vocational educators can learn from the developing field and adapt new strategies to their particular needs.

In this chapter

The plan of this chapter is to introduce the topics shown below:

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Performance Assessment Techniques

The terms "performance assessment," "alternative assessment," "authentic assessment," and "direct assessment" are common in current discussions of measuring student outcomes. While their meanings greatly overlap, each of these terms suggests a different aspect of controversial "new" assessment methods.

Type	Purpose
Performance assessment	Signals that something students actually *do* is being evaluated
Alternative assessment	Signals that evaluation is based on something *other than* standardized testing or similar formats
Authentic assessment	Signals that assessment tasks presented to students elicit worthwhile responses reflective of *real or real-world* competence
Direct assessment	Signals that the evaluation focuses on what we *want* to measure rather than a proxy for it. (E.g., in direct writing assessment, student writings are evaluated rather than responses to multiple-choice questions about grammar, usage, and vocabulary.)

As are the others, performance assessment is an umbrella term for a number of techniques for evaluating what students know and can do. Each of these techniques, in turn, can be adapted by practitioners to respond to various contexts, purposes, and levels of sophistication. What follows is a nonexhaustive overview of performance assessment techniques suggesting some of the variations associated with each.

Profiles and Records of Achievement

In Britain and Australia, there is a dazzling variety of profiles and records of achievement. Some are teacher narratives of student

performance; they may be structured or they may be unrestricted by guidelines of any kind. Some are computer-generated, with teachers selecting coded phrases to describe student behaviors and then feeding these descriptors into the computer for compilation into a report. Some resemble expansions of familiar report cards that use "grids" of teacher-determined letters or numbers that are implicitly norm-referenced evaluations of student performance in prespecified categories.

Some profiles and records are series of continua (from, for example, "requires specific direction" to "often initiates independent effort") along which teachers rate student performance. Some continua label each of a series of stages between the two poles (for example, "requires specific direction," "works independently if general goals are stated," "sometimes initiates independent effort," "often initiates independent effort") implying a sequentiality and a consistency in gradations of difficulty which may not exist. Some continua gather evidence of student progress over time; others are summative evaluations of final accomplishment (Broadfoot, 1987).

Innovators at state, district, and local levels are discovering and rediscovering implementation issues

In the U.S., recent interest in performance assessment has not been accompanied by a nation-wide effort to develop assessment strategies across a wide range of curricula. For the most part, efforts to develop and implement these measures have been isolated and independent. Consequently, innovators at state, district, and local levels are discovering and rediscovering common philosophical and implementation issues. Some issues pertinent to the development and implementation of profiles are suggested below.

Profile Implementation Issues

- To whom does a profile belong, student or college?
- Who protects confidentiality and determines access to a student's profile?
- Who shall determine what is reported, instructor or student?
- Is validity compromised by bias if the student ultimately decides what a profile includes and excludes or if a instructor does?
- Shall nonschool people such as employers and parents contribute to student profiles?
- Shall differences of opinion about student accomplishment be homogenized by a process of consensus-building, or shall variety in judgments be expected and preserved?

- What shall be the provision for student negotiation or appeal?
- Shall only final products be collected or also drafts which might illuminate the student's work habits, response to critique, and ability to generate and develop ideas?
- Shall contents be exclusively academic or shall evidence of out-of-school accomplishments be collected?
- Shall evidence of cognitive ability dominate; shall attention also focus on affective and conative[1] characteristics?
- Shall faculty (and others) be provided guidelines for describing student accomplishment so as to minimize neglect of important evaluative dimensions; or is free response, which promotes unique student descriptions, more beneficial in coming to understand a particular student's achievement?

Cumulative resumes can communicate student progress toward linking learning in school to the workplace

Profiles and records of achievement may be particularly informative as vocational educators begin to develop the kinds of cumulative resumes called for in the Secretary's Commission on Achieving Necessary Skills (SCANS) *Learning a Living* report (1992). Cumulative resumes are intended to contain information about students, beginning in middle school, in order to document progress in courses taken, projects completed, and competence attained. According to SCANS, a new voluntary assessment system that incorporates new methods of assessing performance can help communicate about student performance and certify progress toward standards that link what is learned in school to the workplace.

Portfolios

Examples of student work are included in portfolios to promote a broad representation of achievement

A portfolio may be defined as "a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student reflection" (Paulsen, Paulsen, & Meyer, 1991, p. 60).

Portfolios are conceptually similar to profiles and records of achievement in promoting broad representation of student achievement and in preserving opportunity for student input,

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[1] "The conative components [of ability] are those concerned with determination, persistence, and will . . . [often] ignored or inappropriately subsumed under *affective*. Yet a person can very much enjoy doing something without being determined to see it through—and he or she can hate doing something but still be determined to do it" (Raven, 1992, p. 218).

reflection, and self-evaluation. But whereas profiles typically *describe* student work, portfolios also *include examples* of it.

Portfolios differ from two other types of collections of student work

1. cumulative folders—formal, summative, largely academic and demographic, and teacher-directed to the exclusion of student input; and

2. student journals—informal, nonevaluative, and reflective, without documenting performance.

In postsecondary education, portfolios have been widely used in certain areas including art, photography, and architectural technology (Wolanski, 1992). Today, practitioners are experimenting with portfolios in almost every field of study. At Shoreline Community College in Washington State, portfolios are being used to assess student learning in the classroom and readiness for promotion within the writing curriculum, and to measure program and institutional effectiveness (Hart, Rollman, & Parks, 1992). Students in the English as a Second Language (ESL) program at Seattle Central Community College develop portfolios that demonstrate listening, speaking, reading and writing skills (Loos, 1992). English, sociology, and art students at Washington's Edmonds Community College also develop portfolios to reflect learning in those courses (Martin, Newell, & Scarborough, 1992). Typically, the art portfolios have included materials using a variety of media; efforts to include multimedia information in the other content areas are being contemplated (Martin, 1992). Early positive results indicate that portfolios have application in a wide range of instructional areas.

Demonstrations of Mastery

Public performances to display competent knowledge and skill are demonstrations of mastery

Also called "exhibitions" and "presentations," demonstrations of mastery are more or less public performances intended to display competent knowledge and skill (McDonald, 1992). Demonstrations may be embedded in curricula and everyday practice and evaluated by ongoing, informal observations of students at work and over time. But more often, they are formal, culminating assessments occurring after a course of study. Demonstrations usually involve "production of discourse" (Newmann, 1992, p. 54) in which students summarize and integrate learnings in one or more disciplines. These may be supported by tangible products, experimental conclusions, or solutions to practical problems.

For example, a demonstration of mastery in U.S. history at Walden III High School in Racine, Wisconsin, involves both written work and an oral presentation to a committee of two teachers, an adult

from the community, and an underclassman. Committee members assess

1. a research paper on a topic chosen by the student,
2. an oral elaboration of the paper,
3. a time-line of events and movements highlighting points relevant to the student's research topic, and
4. the student's response to questions and challenges.

At Jefferson Community College in Louisville, Kentucky, students in all curricula are encouraged to participate in contests, complete projects, and display work in art exhibits. A file of qualitative evaluations of these efforts is kept on students who participate. These data contributes to an overall understanding of what the student has learned while attending the college. Efforts are currently being made to collect these demonstrations in concrete form so that they may be presented in a portfolio (Koppel, 1991).

Projects

Individual or collaborative investigations can lead to the development of expertise in specialized topics

Individually or collaboratively, students may be engaged in projects of various kinds. These activities may be original, interdisciplinary investigations that lead to the development of expertise in specialized topics and skills and, perhaps, new knowledge (Raven, 1992).

For example, a student or a group of students might study a machine, a plant, or a transportation vehicle by reading, observing, building models, germinating seeds, interviewing, and/or recording progress. In the process, they might obtain information and develop skills that are specialized—and therefore hard to measure with a standardized test. But the knowledge and methodological competencies gained in such projects are identifiable and assessable when students are observed in action and asked to explain what they have seen and learned.

Performance Tasks

Tasks that are intended to elicit student action and production and that directly reflect complex knowledge and skills are being developed and used to evaluate achievement in various content areas (Wiggins, 1991). Despite believing that these tasks are meaningful measures of important proficiencies, developers are nevertheless finding it difficult and time-consuming to construct

Measuring student achievement of complex knowledge and skills is the focus of performance tasks

performance tasks in some content areas. Concern has been voiced that the specificity of tasks, combined with the time required to complete them, constrains the scope of what can be tested, raising alarm about performance tests' validity and reliability (Haertel, 1992).

In the U.S., performance tasks have been utilized at state and local levels. For example, the New York State Department of Education was the first to mandate science performance tasks to be administered to fourth graders (Gould, 1992). Development of substitutably equivalent tasks, standardization of administration and evaluation, scoring rubrics, and calibration are foci of efforts to develop a national assessment system. These efforts are the subject of intense debate (see Smith et al., 1992).

Theoretical Bases

Learning Theory

Assumptions undergirding performance assessment parallel learning theory

The assumptions undergirding performance assessment harmonize with learning theory advanced in cognitive psychology and qualitative research philosophy. To the extent that performance assessment permits or encourages unique responses to assessment tasks, each student's construction of reality and knowledge is honored.

Implicit are perceptions such as

- Learning and evaluation are subjective processes of the mind.
- Learners are active constructors of knowledge rather than passive recipients.
- Assessors are sensitive appliers of criteria and standards which may be largely intuitive.

Learning is seen as a restructuring of the mind. This restructuring occurs as learners encounter new information, recognize it as important, and reconceptualize their knowledge to include that information. Expertise is gained as information is accumulated and as skill in using and applying information grows. Achievement is seen as the accumulation of increasingly sophisticated knowledge, ease of making connections among different kinds of knowledge, and skill in using and applying what is known (see Camp, 1990; Schuman, 1992; Shepard, 1991).

Assumptions of standardized testing contrast with those of performance assessment

By way of contrast, consider some assumptions evident in standardized testing:

- There is one right answer.
- Fairness requires testees be treated identically.
- Context variables (for example, what has actually been taught) should be discounted.
- Complex knowledge and skills can be meaningfully evaluated by means of multiple-choice questions.
- Achievement is the accretion and cataloging of isolated bits of knowledge.

This view that knowledge is largely static and sequential and that learners are absorbers of identical knowledge structures fails to acknowledge the uniqueness of students and the uniqueness of each person's understandings (see Berlak, 1992a).

Measurement Theory

Validity and reliability are standards for determining the quality of an assessment

Validity and reliability are crucial standards for determining the quality of an assessment. Very briefly, validity is a multifaceted concept of "the *adequacy* and *appropriateness* of *inferences* and *actions* based on test scores or other modes of assessment" (Messick, 1989, p. 13, emphasis in the original). The essential validity question is one of appropriateness of inference: What can be inferred about what students know and can do on the basis of their performances during assessment?

Validity is notoriously difficult to estimate. Achievement is defined and determined in so many ways that it is impossible to say *what* exactly it encompasses, undermining of the appropriateness of inferences (Berlak, 1992a; Cole, 1988; Messick, 1989). In addition, inferences of achievement are easily confounded. For example, a student's general intelligence or "test-wiseness" can affect her test score and lead to erroneous estimations of achievement in a specific content area.

Calculations based on reliability coefficients are sometimes used to estimate validity (Satterly, 1989). This is, at best, insufficient. Demonstrating the validity of an assessment practice or instrument requires gathering many kinds of evidence that inferences drawn, as reflected in the uses made of scores, are reasonable and appropriate without causing harm (Messick, 1989; Moss, 1992).

Reliability traditionally refers to consistency of test scores (Feldt & Brennan, 1989). Reliability and validity are both necessary to determine whether a test accurately represents student ability or

knowledge. If a student attains consistent scores on parallel assessments, it strengthens inferences that this score represents what has been learned. But it is possible that consistent scores may be invalid. For example, a student may score 90% on several equivalent forms of a science test but the score may be more reflective of general intelligence, reading ability, or test-wiseness than it is of knowledge of science. In such a case, the tests have been reliable—the scores have been consistent—but the likely inference that the student is competent in science is of questionable validity.

Different kinds of validity and reliability concerns arise with different kinds of student assessments. The following table suggests the nature of some of these concerns for both performance assessment and standardized testing.

Validity and Reliability Concerns

Performance assessment	
Validity	Subjective, holistic evaluation opens possibilities of scores distorted by rater bias, level of expertise, familiarity with assessee, and so forth (Linn, 1991; Stiggins, 1991).
Reliability	Reliability can be difficult to obtain for two main reasons. First, defining reliability as consistency of scores for different performances is problematic because test-retest opportunities are limited by time and paucity of equivalent tasks (Linn, 1991; Linn, Baker, & Dunbar, 1991). Second, defining *interrater* reliability, a variant, as consistency of scores for a single performance from different assessors presents the difficulty that raters may disagree about the score for a single performance (see Stiggins, 1987).
Standardized testing	
Validity	Validity may be compromised by measuring achievement in complex domains via simplistic multiple-choice questions chosen for their capacity to differentiate and rank student performances and for their internal consistency (i.e., the correlation of performance on one test question with performance on all test questions) (Ennis, 1979) rather than for

content representativeness or relevance (Messick, 1989).

Reliability

Reliability is compromised by test developers' methods for calculating reliability coefficients—*not* from different scores attained on different administrations of equivalent tests *or* from different raters' evaluations of a single performance but rather from internal consistency of test items (Ennis, 1979; Satterly, 1989). Internal consistency as the driver for reliability coefficients presses for homogeneity of test content even in heterogeneous domains.

Rater training should prepare instructors to form valid inferences based on evidence of student competence

Because there is concern about variability in teacher scoring of student performances, training of assessors is advocated in many places (Linn, Baker, & Dunbar, 1991; Stiggins, 1987). This practice, it has been argued, increases the reliability of the assessment. However, training to increase reliability limits the range of inferences in order to reach consensus. In other words, training sacrifices validity to raise interrater reliability. Assessor training should focus not on restricting the range and bases of inferences instructors can make but rather prepares them to form valid inferences based on evidence of student competence weighed against reasonable, perhaps student-specific standards of performance.

Advantages of Performance Assessment

Student Outcomes

Empirical evidence that performance assessment improves student outcomes is patchy. However, in both secondary and postsecondary education where performance assessment has gained a foothold among assessment practices, good news is reported.

For example, at Walden III High School, where graduation depends upon portfolios and demonstrations of mastery in sixteen academic and personal growth areas, alumni earn higher standardized test scores including ACT scores (Racine Unified School District, 1990b), higher salaries in post-secondary employment (Racine Unified School District, 1990a), and higher collegiate freshman grade-point averages ("Grades," 1986; "Suburban Students," 1981) when compared to alumni from local high schools (Mabry, 1992).

In the Pittsburgh Arts PROPEL schools, students creating portfolios that reflect the composition process reportedly write better, develop internal standards of quality, and think of themselves as professional

writers (Camp, 1990). Other sites also offer significant evidence of important and positive student outcomes (see Archbald & Newmann, 1992).

Student Motivation

A primary reason for using performance assessment is the opportunity for student participation in assessment processes, resulting in heightened motivation about school in general. In a Michigan pilot program, "Sites that had students actually begin developing portfolios reported increased [student] motivation, more interest in schoolwork, and increased self-esteem" (Stemer, Brown, & Smith, 1992).

Distinctions are blurred between assessment and learning when performance tasks are used

Advocates of performance assessment hold that students cannot fully display what they know and can do *except* in response to motivating tasks (Raven, 1992). Just as students learn better when they are motivated, they also perform better on assessments when they are motivated. Interesting assessment tasks calling for student-valued and complex skills not only provide useful evaluations but also positive learning experiences. In this way, distinctions between assessment and learning are blurred; it is not merely that assessment *informs* future instruction but that assessment *is* instructive (Camp, 1990).

Self-assessment and Reflection

Performance assessment often involves students in the evaluation process, eliciting reflection and self-assessment. Self-assessment is a highly beneficial educational goal because the ability to monitor one's own performance is an important component of professional or adult competence. Although its attainment is obstructed by the remote scoring of standardized tests, development of self-assessment skill can be reasonably expected from many performance assessment techniques. Many performance assessment practices explicitly call for self-assessment.

Student reflection enhances personal investment in schooling by promoting appreciation and exploitation of opportunity for learning and career preparation. In this way, performance assessment helps students consider what they need to learn in order to become competent adults and professionals and motivates them to take advantage of opportunities to learn it.

Development of Personal Standards of Quality

Implicit in the discussion above is that reflection and self-assessment promote the development of personal standards of quality.

Competence is distinguished by the ability to conceptualize and create quality products and services. Performance assessments that encourage or require formal or informal self-assessment provide opportunities to generate and adopt such standards. Reflection upon the adequacy of one's skills and performance is the crucial intermediate step in development of personal standards of quality. There is typically no provision for this step in traditional secondary and postsecondary curricula or timeframes (Raven, 1992).

Implementation Issues

Feasibility in Terms of Time, Funding, and Space

There are many charges that standardized testing consumes more resources than results justify—approximately one-hundred hours per classroom per year (Smith & Rottenberg, 1991) and approximately half a billion dollars spent nationally per year (Paris, Lawton, Turner, & Roth, 1991). On the other hand, administering and assessing performance tasks of various kinds is—or will be—time-consuming (Linn, 1991), perhaps enormously so.

Whether performance assessment requires greater funding than standardized testing is a somewhat controversial issue. Direct writing samples, currently incorporated into a number of large-scale testing programs, are more expensive to score than machine-scannable multiple-choice answers. But standardized testing also involves test construction, analysis, reporting of results, marketing, and so forth. Incorporating performance assessment into regular classroom activities might ultimately be less expensive, even when the cost of training teachers, hiring of external evaluators, setting up equipment, and providing storage space are considered.

Faculty/Staff Development and Commitment

Preparation of instructors to carryout assessment of earning is crucial

In many performance assessment schemes, instructors are the primary assessors. However, the vast majority of faculty members are not prepared to deal with the demands of holistic assessment of complex learnings and skills. In fact, most faculty are not prepared to deal with assessment tasks at all (Stiggins, 1991). For this reason, most performance assessment plans include recognition of the need for faculty development.

Performance assessment demands faculty preparation and also teacher commitment. Faculty need to understand their task and also to believe in its benefits in order to commit the necessary time and energy (Raven, 1992). In some practices, additional external

expertise has been sought. For example, at Walden III High School, community members and students also act as assessors. Their intuitive understandings of what constitutes adult competence and their intimate acquaintance with students help them to make informed judgments.

Public Credibility

Performance assessment has not gained the public credibility awarded to standardized tests. Rightly or wrongly, people approve many uses of standardized tests, including uses known by measurement specialists and test developers to be ill-advised. The desire to compare educational performance—that of students, educational programs, colleges, districts, states, and countries—fuels demand for numerical indicators of quality to facilitate ranking. Unfortunately, these rankings are often made without considering crucial information regarding the context in which the tests were administered and the purpose they were intended to serve.

Psychometric Vulnerability

It is doubtful that any state assessment officer or educational administrator would choose to administer to students a test whose validity or reliability were questioned; these psychometric standards are equated with assessment quality. An accusation that a test is not valid (although validity is really a property of the inferences based on a test, rather than a property of the test itself) or not reliable would be fatal.

Validation of performance assessments is increasingly demanded

Performance assessments are sometimes administered without any empirical evidence of validity and reliability. Although some evidence exists (see Mabry, 1992), claims of the validity and reliability of these types of measures tend to be speculative (Moss, 1992). Pressure is increasing for these techniques to demonstrate validity and reliability or, alternatively, for researchers to develop new conceptions of validity and reliability or new validation criteria more appropriate to these types of assessments (Frederikson & Collins, 1989; Linn, Baker, & Dunbar, 1991; Moss, 1992). Now that exploration of performance assessment techniques is becoming widespread, demands for evidence of success will likely increase (Brewer, 1992).

Legal Standing

To date, no federal court cases have challenged performance assessment, but legal precedent regarding standardized testing of students and performance testing of employees suggest that they involve potential legal issues. If an assessment has adverse impact

on a protected minority group, validity is a probable concern. Questions such as the following would likely be posed:

- What constitutes evidence of validity?
- Must the assessor prove the assessment is valid or must the student being assessed prove it is invalid?
- Will evidence of more valid alternatives be required?

Many educational decisions are of the high-stakes variety—that is, they strongly affect people or institutions. Assessment data are often used to justify high-stakes decisions. For example, standardized test scores are regularly used as the basis for selecting students for college enrollment or for special services such as gifted or remedial programming and for selecting schools or districts for rewards or corrective action.

If an assessment is used for high-stakes decision making, courts are likely to require high interrater reliability by *disinterested* raters—forcing teachers out of assessor roles. However, the courts are also likely to allow good faith attempts to advance measurement practice (Phillips, in preparation).

Suitability for Large-Scale Assessment or Accountability

Considerable question exists as to the appropriate purposes and uses for performance assessment. One concern is whether performance assessment suitable for classroom and/or school or college uses may also be suitable for district, state, or national assessments. Some argue that these techniques are ipsative[2] measures suitable for judging the achievement of individual students, but that they fail as comparative measures for judging individual or group achievement; others counter that scores can be made comparable by means of moderation[3] (Radnor, 1991; Vermont State Department of Education, undated) or rater training (Stiggins, 1991).

That performance assessments are context-specific (Berlak, 1992b) is seen by some to be an advantage. Sensitivity to local contexts enhances understanding of student achievement within that context, but it obstructs comparison of students in different contexts. For this reason, doubts exist as to whether performance assessment is viable for an entire district, much less for a state or for the country.

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[2] Ipsative measures rely on the assessee as the sole referent, evaluating, for instance, the relative strengths and weaknesses of an individual or her progress over time. Contrastingly, comparative measures facilitate judgments about an individual's attainment compared to that of a group of apparently similar others.

[3] Moderation is a process of developing agreement as to performance criteria, standards, and evaluations. It is characterized by discussion among assessors as to what to look for in student performance, what constitutes sufficient competence, and what scores to award to particular student artifacts.

Performance assessments that are context specific enhance understanding of individual student achievement but obstruct comparison on a wider scale

Large-scale performance assessments are being implemented (see Baker, Aschbacher, Niemi, & Yamaguchi, 1992), suggesting the possibility of neutralizing the effect of local contexts for cross-context comparisons. But if sensitivity to context is perceived as a strength, diluting that sensitivity may be a serious mistake.

Large-scale assessment programs usually involve high-stakes comparisons of students, personnel, and/or educational institutions or entities. High stakes to *institutions* invariably corrupts the assessment of *individuals* (Linn, 1992). This is because low student scores can embarrass education providers, who are in a position to manipulate scores in a variety of ways (Cannell, 1987). For example,

- Test time can be lengthened by the person administering the test.
- Teachers can be shown tests early and drill students on test problems.
- Hints or too much help can be given in answering questions of students taking tests.
- Special education students can be sent on field trips on test days or defined as being ineligible for testing.
- Curriculum can be manipulated to ensure that test-specific topics are taught before tests are given.

"Score pollution" (Haladyna, Nolen, & Haas, 1991) deprives scores of meaning. Meaningless scores obstruct student, personnel, program, and institution evaluations. This inevitable situation, evident across the country, makes the use of test scores for accountability purposes an exercise in delusion.

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Conclusion

This book has discussed innovations in outcomes assessment for postsecondary education identified during a two-year research effort of the University of Illinois site of the National Center for Research in Vocational Education (NCRVE). This project involved two-year public and private postsecondary institutions in a descriptive research study to identify and document various approaches to outcomes assessment. A primary goal of this publication was to describe these approaches and to challenge readers to consider how they could be applied to their own settings to stimulate improvements in vocational education. Local leaders, institutional researchers, and policymakers were our primary audience.

As was pointed out in Chapter One, there are many driving forces behind efforts to improve outcomes assessment in postsecondary institutions. Forces external to the colleges—such as government agencies, accreditation associations, business and industry, and new federal mandates—all encourage improved outcomes assessment practices. Each of these groups has a somewhat unique rationale for encouraging outcomes assessment; however at some level, each recommends assessment as a means of enhancing student learning. The need to improve programs and enhance assessment processes is also recognized internally. The increased diversity in student populations and in patterns of enrollment are behind the efforts of many postsecondary institutions.

Postsecondary institutions are being encouraged by many groups to seek a broader set of outcomes than they have assessed traditionally and reexamine the means by which these outcomes are being measured. As new initiatives such as Tech Prep (technical preparation) and academic and vocational integration emerge, alternative approaches to outcomes assessment are essential. This book has sampled a selected few of these alternative approaches

and suggested ways each could contribute to improving postsecondary education.

Six Alternative Approaches

In this book, six different approaches to outcomes assessment were described. Each of these approaches provides a unique perspective to conceptualizing, collecting, and analyzing outcomes for postsecondary education. A brief summary of these alternative approaches helps to provide a framework for thinking about issues and strategies related to implementation of outcomes assessment.

Total Quality Management (TQM)

Business and industry in America is adopting total quality management (TQM) because of its need to improve quality to increase economic competitiveness. First advocated by Deming in Japan TQM is now being contemplated in relation to educational reform. Fundamental goals of TQM, reported in Chapter Two, are to manage and improve work processes; identify, meet and exceed customer needs; ensure that the entire system is the focus of measurement for the purpose of making continuous improvements; and ensure that everyone is involved in carrying out the initiative. In a TQM approach, outcomes assessment is viewed as evidence of the effectiveness and efficiency of processes and programs interacting within the institution. Outcome measures provide evidence of the value of vocational education to students; deviations from specified performance standards are analyzed and fed back into the system to make improvements. Assessment for the purpose of accountability is recognized as part of this approach, but it is not the primary goal. The more critical purpose of TQM is to create and support an environment that yields continuous quality improvement.

The Student Success Model

The goal of the student success model is to create an institutional environment that contributes to developing and maintaining student success. The concept of "success" is defined by students, many of whom enroll in vocational education programs, as they enter and move through the postsecondary institution. This model is based on the premise that students are in the best position to define "success" for themselves and, therefore, for the institution and its programs. Student goals and intended outcomes form the basis for an extensive, institution-wide assessment system which potentially provides a far different approach than an assessment system devised from outcome measures and performance standards established by external groups (e.g., governing boards and accreditation agencies). In practice, when using the student success model, Santa Fe Community College has found it feasible to meet its own high standards, as was reported in Chapter Three, as well as to demonstrate accountability to external bodies. An important part of this model involves encouraging students to set

high standards, documenting their goals and intended outcomes, and monitoring their progress toward obtaining these outcomes.

Value-added Assessment

The concept of value added can be applied to assessment of institutional effectiveness, program quality, or student learning. In Chapter Four, how value-added assessment can be used to determine the value of an educational experience for students was explored. At the heart of value-added assessment is a strategy that provides a baseline of information about entry-level competency, often determined with a pretest, compared with exit-level performance, usually measured with a posttest. Through this design, it is purported that an institution or program can determine what value it has added to a student's array of competencies. By using this approach in vocational education, it would be possible to determine skills attained by students as they complete critical levels (i.e., benchmarks) of a program which could be helpful in determining how effective a program has been for the many individuals who move in and out of college or into the job market without finishing a degree or certificate. Further, even though value-added assessment has been conducted traditionally using a pretest and posttest design, the potential for using alternative assessment approaches such as performance assessment appears feasible.

Concept Mapping

Concept mapping is a practical approach to conceptualizing how an educational program works as a basis for identifying outcomes. As was described in Chapter Five, it is a bottom-up approach that relies on input from practitioner stakeholders who play a part in the design and delivery of a program. The results of a concept mapping activity are displayed in a pictorial map that shows what practitioners think about how a program produces outcomes. Concept mapping employs small group processes, sorting and rating techniques, and multivariate statistical analysis techniques to visually represent the program in the form of a map. Vocational educators can use the approach to conceptualize outcomes by involving postsecondary educators, administrators, and students as well as community, business, industry, labor, or other representatives. Information produced by a concept mapping activity implicitly and explicitly defines what vocational education experts believe in and what they practice. The maps have been found to be useful for conceptualizing vocational education outcomes in three different postsecondary education settings.

Assessment of vocational education outcomes

A comprehensive approach to outcomes assessment for vocational education must consider the needs of its clients, the educational processes associated with its programs, and the outcomes achieved by its students. Developing a set of outcomes without thorough understanding of client needs or the goals of educational processes is potentially a meaningless exercise. Chapter Six suggested that a comprehensive set of outcomes should evolve from the economic, educational, and psychological and sociological underpinnings of vocational education. The process of

designing outcomes assessment for vocational education involves five steps: (1) selecting outcomes to be assessed, (2) identifying indicators for each outcome, (3) identifying information collection arrangements, (4) determining the analysis procedures, and (5) reporting the information.

Performance Assessment

Performance assessment is an umbrella term used to describe techniques such as "alternative" or "authentic" assessment. Each of these assessment techniques is designed to assess directly what students know and can do in a form other than paper and pencil or multiple choice tests. Several examples of these techniques were described in Chapter Seven. They are profiles and records of achievement, portfolios, demonstrations of mastery, projects, and performance tasks. These types of techniques are particularly advantageous in measuring student outcomes that are difficult to quantify using paper and pencil or multiple choice tests and in motivating students to learn, involving them in evaluation processes and promoting their development of personal standards of quality. Since many of these techniques are being used only recently, educators continue to struggle with such issues as cost, faculty development, and public credibility. Although vocational educators have been active users of performance tasks historically, the recent development of other assessment techniques such as portfolios or curriculum resumes appear to hold promise new advancements for the field.

Twelve Implementation Strategies

There are a number of reoccurring themes that appear throughout this book. Two of these are the importance of linking outcomes assessment to institutional mission and the necessity for understanding the needs of students as a basis for establishing outcomes measures. In this section, we present these and ten additional implementation strategies as a basis for encouraging implementation of outcomes assessment.

Strategy 1: Ensure that a clear institutional mission provides a framework for assessing vocational education, including institutional outcomes, program outcomes, and student outcomes. Knowing exactly what drives the institution and what is envisioned to be accomplished as a collective body is crucial to developing meaningful outcomes assessment systems for all educational curriculum, including vocational education.

Strategy 2: Focus outcomes assessment on improving the entire institution (i.e., system) and the processes functioning within it. To accomplish this, it is necessary to examine the adequacy of inputs, how inputs link to processes, and how

processes ultimately influence outcomes. Clearly, this approach requires that vocational education *not* be isolated from other curriculum efforts of the institution. In fact, it is essential to know how other programs and services within the institution influence the vocational education curriculum and its students.

Strategy 3: Gain top institutional commitment to an outcomes assessment system. Chief executive officers (CEOs) and other institutional leaders must commit material and personnel resources, build a shared vision, and devise policy that supports faculty and staff in carrying out outcomes assessment for the purposes of improving quality and demonstrating accountability.

Strategy 4: Provide mechanisms for scanning the external environment and develop processes to enhance the reciprocal relationship between colleges and their local communities. Community colleges and other two-year postsecondary institutions cannot operate in a vacuum. It is crucial that data collection procedures be developed and carried out routinely to inform both the college and the surrounding community about needs as well as services that each can provide. This exchange of information between internal and external stakeholders (i.e., customers) is critical to maintaining an outcomes assessment approach that can feed information back into the system to make improvements.

Strategy 5: Methods used to conceptualize outcomes for vocational education should be democratic, actively involving a wide range of stakeholders. Consensus is needed from the stakeholders of vocational education, those internal and external to the institution, about outcomes that should be achieved. Once a broad-based, grass-roots consensus is reached, these outcomes can be translated into outcome measures, performance indicators, and standards.

Strategy 6: Make the goal of identifying and meeting individual student needs a top priority for vocational education. A philosophical perspective that places individual student success at the center of the program creates the necessity for a highly flexible assessment system. Whereas this system will be complex to operationalize, it promises to yield valid information about the effectiveness of vocational education programs, especially compared to systems based on goals and outcomes that have little relevance to students or faculty in postsecondary education.

Strategy 7: Build an organizational structure that supports data-driven decision making, planning, and program improvement. At the heart of this structure are teams comprised of faculty, staff, and possibly students. These groups are empowered to make many important decisions about implementation of outcomes assessment. For this structure to work effectively, there must be clear lines of communication throughout

the institution. In addition, people need opportunities to acquire the skills and knowledge needed to make decisions about outcomes assessment.

Strategy 8: Use multiple measures to develop comprehensive records of student performance. These records need to show how students are performing as they progress through a vocational education curriculum as well as how they are performing at the time of completion. Multiple measures, using a mixed-method approach that captures qualitative and quantitative data, appears to provide valuable information about the different kinds of student learning that occur in the postsecondary setting.

Strategy 9: Conduct program audits on a routine basis. Whereas there is value in conducting program reviews on a regular schedule, typically every five years, this approach has potential for missing opportunities for improving programs on a continuous basis. A five-year funding cycle assumes a stable environment, however much change can occur in a five-year time period. In addition to a regularly scheduled five-year review, we recommend using program audits to eliminate problems *as they arise*. In essence, data should be collected and analyzed continuously on key aspects of any vocational education program. These audits provide information for improvement on an on-going basis.

Strategy 10: Make sure there are feedback loops for continuous improvement. A systematic approach to conducting outcomes assessment at the institution, program, and student level helps to ensure that information is used to make improvements. Opportunities to improve are identified and addressed when an organizational structure is employed that provides open lines of communication about how the institution is functioning.

Strategy 11: Design reward systems (e.g., compensation, promotion) that support the use of outcomes assessment system for improvement. It is essential that an institution revise reward policies to reinforce individual as well as collective, team efforts to improve programs. To be effective, this type of system needs to be highly responsive to needs; it must also clearly emphasize the importance of improving the entire system to enhance outcomes.

Strategy 12: Develop dissemination strategies that support the intended use of the data. Sometimes these dissemination strategies involve distributing findings widely; other times they mean limited circulation of information. The important deciding factor is made by individuals who need to use the information to make improvements.

Implementation Issues

We conclude this book with several important questions about outcomes assessment in postsecondary education. These questions are posed to encourage innovation, not to stifle progress. Solutions to these questions will not be found quickly or easily. However, they are posed to stimulate discussion in your institution about how alternative approaches to outcomes assessment can be enhanced to improve the quality of vocational education.

Discussion Questions

How can your institution develop a culture that values outcomes assessment? Is it possible to move away from the perception that evaluation is to be dreaded rather than appreciated for how it can improve quality?

What should be the balance between outcomes assessment for accountability and program improvement? If your assessment system is designed to meet the mandates of external groups, how can it also meet your internal needs for policy improvement?

How can commitment from your administrators and faculty be gained and reinforced to sustain an outcomes assessment system over the long term?

Who should be involved in the process of conceptualizing outcomes? What role should students play? How will your institution resolve competing interests of different stakeholder groups?

How should your institution move forward with assessing outcomes that *all* agree are important but are extremely difficult or costly to measure?

How can the next generation of performance assessment techniques be developed and implemented more quickly within your institution?

How can your institution ensure that its outcome measures will not isolate vocational education rather than integrate it into the curriculum?

How can the concept of continuous improvement be employed for your postsecondary vocational education programs? What kind of information will be needed to accomplish this goal?